Conceptual Compensatory Wetland Mitigation Plan

New England Portion

for the

Connecticut Expansion Project

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1.1 INTRODUCTION AND OVERVIEW

Tennessee Gas Pipeline Company, L.L.C (“Tennessee”) is filing an application for a certificate of public convenience and necessity with the Federal Energy Regulatory Commission (“Commission” or “FERC”) for the Connecticut Expansion Project (the “Project”) in Albany County, New York, Berkshire and Hampden Counties, Massachusetts and Hartford County, Connecticut. In addition to the FERC filing, Tennessee is filing with the appropriate regulatory agencies, including the U.S. Army Corps of Engineers (“the Corps” or USACE”) and state and local agencies to account for and mitigate potential wetland and watercourse impacts associated with the proposed Project. The enclosed Compensatory Wetland Mitigation Plan (“Wetland Mitigation Plan”, “WMP”, or “Plan”) was prepared for the New England portion of the Project in support of these regulatory filings. This Plan is conceptual in nature and will be expanded upon during the Project’s review, design and permitting process.

The proposed Project involves the construction of two sections of new 36-inch pipeline looping totaling 1.35 miles in New York and 3.81 miles in Massachusetts, and one section of new 24-inch pipeline looping totaling 8.10 miles in Massachusetts and Connecticut. To the extent that it is practicable, feasible, and in compliance with existing law, Tennessee proposes to locate the approximately 13.3 miles of pipeline loops within or adjacent to the right-of-way (“ROW”) associated with its existing pipelines designated as the 200 and 300 Lines. Tennessee proposes to begin construction of the Project facilities in fourth quarter 2015 and, provided the required regulatory approvals are received, place the facilities in-service by November 2016. Additional detail regarding the proposed project is presented in the sections below and in the accompanying regulatory filings.

The Project is proposed by Tennessee, a wholly-owned subsidiary of Kinder Morgan, Inc. and a major supplier of natural gas to utilities and power generators in the Northeast. The total estimated cost of the Connecticut Expansion Project is approximately $81.2 million. Connecticut Natural, Yankee Gas and Southern Connecticut have signed long term agreements with Tennessee for the additional transportation capacity that CT Expansion Project will add to the Tennessee Gas Pipeline system.

The Connecticut portion of the Project will traverse the municipalities of Suffield and East Granby. The Massachusetts portion of the Project will traverse the municipalities of Sandisfield and Agawam. Additional detail regarding the Connecticut and Massachusetts portions of this project are presented below. As noted, the Project contains a New York component; however, the Conceptual Mitigation Plan for the Connecticut Expansion Project – New York Portion is being prepared under separate cover, in support of the New York Department of Environmental Conservation / USACE Joint Application for Permit. USACE personnel have indicated that the New York and New England Districts (“NED”) will collaborate closely regarding this authorization request. Tennessee will be pleased to provide a copy of the New York Conceptual WMP Plan or any other requested documentation upon NED’s request.

Because the Project is predominantly sited within and directly adjacent to existing ROWs, thereby eliminating the need for a new or “Greenfield ROW”, environmental impacts of the Project were minimized. Additionally, effects to wetlands and waterbodies have been avoided or minimized by locating structures, access roads and staging areas outside of resource areas to the extent practicable. The Project will not traverse any watercourses that are designated as navigable or otherwise subject to jurisdiction under Section 10 of the Rivers and Harbors Act of 1899, or that are designated as a National Wild and Scenic River under the National Wild and Scenic Rivers Act (16 U.S.C. 1271-1287). Unavoidable effects, however, will occur to jurisdictional Waters of the United States (i.e., those regulated under Sections 401 and 404 of the Federal Clean Water Act (“CWA”) – 33 U.S.C. § 1341 and

33 U.S.C. § 1344) from construction activities. In addition to the CWA, the Project is subject to state wetlands-related statutes and regulations.

According to USACE regulations, the fundamental objective of compensatory mitigation is to offset environmental losses resulting from unavoidable impacts to waters of the United States (33 CFR 332.3(a)). The criteria for compensatory mitigation are set forth in the USACE's mitigation regulations, the U.S. Environmental Protection Agency's ("USEPA's") companion CWA regulations (40 CFR 230) and in the "USACE's NED Compensatory Mitigation Guidance (July 2010)". Both the USACE and the USEPA have established a national goal of no overall loss of wetland functions, as detailed in the agencies' 1990 Memorandum of Understanding and respective mitigation regulations (33 CFR Parts 325 and 332; 40 CFR 230)). The NED Compensatory Mitigation Guidance incorporates these mitigation requirements, as well as those contained in the "USACE's Regulatory Guidance Letter No. 08-03: Minimum Monitoring Requirements for Compensatory Mitigation Projects Involving Restoration, Establishment, and/or Enhancement of Aquatic Resources (October 10, 2008)". In addition to these federal requirements, Connecticut and Massachusetts (as well as New York) have each established general goals and objectives for compensatory mitigation of aquatic resource impacts that the Conceptual Wetland Mitigation Plans are intended to address.

The enclosed plan is conceptual in nature and the final Compensatory Wetland Mitigation Plan will be developed to follow the USACE NED Compensatory Mitigation Guidance and Checklist Instructions contained therein. The Plan includes a description of Project impacts, objectives and preliminary mitigation strategies, in addition to required graphics and additional supporting information. Additional information pertaining to the anticipated impacts and construction sequencing are available in the Project's permit authorization requests. This Plan includes state-specific compensatory mitigation programs (see Sections II and III) to offset the resource impacts associated with the Project in each state. Tennessee intends to expand upon this conceptual Plan, as based on consultation with and comments from USACE, USEPA, state and local regulatory authorities, and other stakeholders in the compensatory wetland mitigation discussions.

1.2 PROJECT DESCRIPTION

The proposed project, as currently configured, would involve the construction of approximately 13.3-miles of pipeline looping (i.e., the installation of additional pipe to adjacent to the existing pipeline) in New York, Massachusetts, and Connecticut. The proposed Connecticut Expansion Project facilities are as follows:

- 1.4-miles of 36-inch pipeline loop in Albany County, New York;
- 3.8-miles of 36-inch pipeline loop in Berkshire County, Massachusetts;
- 8.1-miles of 24-inch pipeline loop in Hampden County, Massachusetts and Hartford County, Connecticut;
- Minor tie-in piping;
- One new Main-line-valve ("MLV"), and;
- Moving and relocating certain pigging facilities.

The pipeline loop segments will be located within or directly adjacent to Tennessee's existing permanent ROWs, to the extent practical. Additional permanent ROW will be required along with temporary workspace ("TWS") and additional temporary workspace ("ATWS") to facilitate construction of the pipeline. The routing for the pipeline loop was conducted in a manner to avoid significant areas of residential development, minimize the number of affected landowners, and effectively minimize environmental impacts. The majority of the existing land use in the Project area consists of upland forests, open land, agricultural land and wetlands. There are virtually no residential land impacts and the pipeline alignment itself does not cross any residential land use.

Typically, pipeline construction will require between 100 to 125 feet of workspace depending on the size of the pipeline to be installed. This Project limits workspace within wetlands to 75 feet in width, unless topographic conditions or other safety concerns require additional workspace. The varying construction ROW widths for this project for the 36-inch loops in New York and Massachusetts and the 24-inch loop in Massachusetts and Connecticut are based on guidelines for safe construction of similarly sized pipelines developed by the Interstate Natural Gas Association of America ("INGAA"). The proposed standard construction ROW widths are expected to allow for safe installation of the pipeline facilities based on the variable topographic terrain and diverse land use types crossed by the Project.

Following construction, vegetation within the permanent ROW will be maintained in an herbaceous state, except in wetlands and adjacent to perennial streams, where maintenance clearing of woody vegetation will be limited. In these areas, a 10-foot wide corridor centered over the pipeline will be permanently maintained in an herbaceous state and trees with roots that could compromise the integrity of pipeline coating within 15 feet of the pipeline will be selectively cut and removed from the permanent ROW while the remaining temporary and permanent ROW will revert to its pre-construction land use/land cover once construction is complete.

1.3 WETLAND IMPACTS

The Project has been designed to avoid or minimize adverse impacts to water resources to the extent practicable. For example, contractor pipeyards and appurtenant facilities (including pig launchers/receivers and mainline valves) are located outside of aquatic resource areas. Pipeyard facilities will be constructed outside the boundaries of any nearby wetlands and BMPs consisting of silt fencing and other appropriate sedimentation controls will be installed to prevent the disturbance of wetland habitat and the transport of sediments from active Project locations to wetlands.

However, due to the linear nature of the existing pipeline, current ROW ownership alignment and physical requirements of the proposed looping, some Project activities will affect wetlands and watercourses, and some new structures, access roads, and work sites will necessarily be located within wetlands. Due to these unavoidable conditions, the Project will result in temporary and permanent direct and indirect impacts to state- and federally- regulated wetlands.

Temporary impacts to wetlands and watercourses are associated with the construction of the new ROW, access routes, TWSs and ATWSs. Temporary wetland impacts within these areas may include soil disturbance, temporary alteration of hydrology and loss of vegetation during construction. Upon completion of construction, topsoil, contour elevations and hydrologic patterns will be restored, and disturbed areas will be reseeded or replanted to promote the re-establishment of native hydrophytic vegetation. All TWS and ATWS areas will be restored to pre-construction grades and contours, and reseeded and/or replanted during restoration activities.

Following construction and restoration, the TWS and ATWS areas will not be maintained during operation of the proposed facilities and will be allowed to revert back to their pre-construction land use and vegetation cover type.

No permanent filling or other loss of wetlands is proposed for any of the loop pipelines in Connecticut or Massachusetts. All wetlands will be substantially restored to their pre-construction grades, contours, and drainage patterns, and reseeded or replanted with native hydrophytic vegetation species. As such, the permanent impacts to wetlands associated with the Project will consist of a conversion of forested wetlands to scrub shrub / emergent wetland cover types and the conversion of scrub shrub wetlands to emergent wetland cover types.

Woody vegetation within the new permanent ROW will be allowed to regenerate within such ROW except for a 10-foot wide area centered over the pipeline loops that will be maintained in an herbaceous/scrub-shrub state to allow for inspection and maintenance of the pipeline loops once the

Project is in-service. In addition, trees with roots that could compromise the integrity of pipeline coating within 15 feet of the pipeline may be selectively cut and removed from the new permanent ROW. Additional detail pertaining to the wetland functions and values as well as the minimization and mitigation of impacts to these functions and values is presented in the Functions and Values sections (Sections 2.2 and 3.2).

A summary of impacts to Waters of the United States anticipated for the entire Project is provided in Table 1-1 below. These impact estimates are conservative and represent a worst case scenario. Actual impacts to wetlands are likely to be less than these estimated values. Section 2 and Section 3 provide detail regarding the state-specific wetland and watercourse resource impacts and proposed mitigation in Connecticut and in Massachusetts.

Project impacts were categorized into "Permanent" and "Temporary" impacts, as well as into "Direct" and "Indirect" (or Secondary) impacts. "Direct permanent" impact associated with this Project are limited to the fill required for the construction of access roads; however this fill is relatively minimal (0.07 acres, or approximately 113 cubic yards combined in MA and CT). The remainder of the Project's impacts may be considered indirect or secondary and are associated with the conversion of wetland vegetation type. The construction impacts noted in Table 1-1 may be considered "temporary indirect" impacts and operational impacts noted in Table 1-1 may be considered "permanent indirect" impacts. Additional information pertaining to wetland impacts by municipality is presented in Table 1-2.

TABLE 1-1
ESTIMATED ACREAGE OF WATERS OF THE UNITED STATES TO BE IMPACTED - NEW ENGLAND PORTION

Facility ID[a]	Palustrine Emergent (acres affected)		Palustrine Forested (acres affected)		Palustrine Scrub-Shrub (acres affected)		Total (acres affected)	
	Construction[b]	Operation[c]	Construction[b]	Operation[c]	Construction[b]	Operation[c]	Construction[b]	Operation[c]
Massachusetts Loop	3.34	0.00	6.03	2.11	0.21	0.09	9.58	2.20
Connecticut Loop	24.43	0.00	18.66	6.72	1.88	0.15	44.97	6.87
PROJECT TOTAL	**27.77**	**0.00**	**24.69**	**8.83**	**2.09**	**0.24**	**54.55**	**9.07**

a: These values do not include 0.37 ac of temporary impacts associated with stream crossings in CT and MA, where benthic habitats and banks will be restored in-place consistent with pre-existing conditions, or improved where possible.

b: Construction Acreage = all workspace during construction activities (TWS and ATWS plus permanent easement).

c: Operation Acreage = For conventional crossing methods: 30-foot width permanently maintained through forested wetlands, 10-foot width permanently maintained through scrub-shrub wetlands; there are no operation impacts to PEM wetlands as there is no change in the pre- and post-construction vegetation cover type.

TABLE 1-2
SUMMARY OF TEMPORARY AND PERMANENT IMPACTS BY MUNICIPALITY FOR MASSACHUSETTS AND CONNECTICUT

Municipality	Pipeline Impacts (acres)		Pipeyard / Contractor Yard Impacts (acres)		Wetland Tree Removal (acres)[2]		Access Roads in Wetlands (acres)		Non-wetland Tree Removal (acres)[3]	
	Temporary	Permanent[1]	Temporary	Permanent	Temporary	Permanent	Temporary	Permanent	Temporary	Permanent
Massachusetts										
Agawam	0.58	0.13	0.00	0.00	0.32	0.13	0.00	0.00	0.16	0.14
Sandisfield	9.70	2.20	0.00	0.00	6.03	2.11	0.00	0.06	27.52	8.89
Tyringham	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Massachusetts Total[4,5]	10.28	2.33	0.00	0.00	6.36	2.24	0.00	0.06	27.68	9.03
Connecticut										
East Granby	4.27	1.53	0.00	0.00	2.47	1.51	0.00	0.00	2.55	1.60
Suffield	40.01	5.21	0.00	0.00	15.96	5.08	0.00	<0.01	5.84	3.87
Connecticut Total[4,5]	44.28	6.74	0.00	0.00	18.34	6.59	0.00	0.01	8.39	5.47
PROJECT TOTAL[4,5]	**54.56**	**9.07**	**0.00**	**0.00**	**24.69**	**8.83**	**0.00**	**0.07**	**36.07**	**14.50**

*Note: Impact areas are of federal wetlands and do not include impacts to the state-regulated upland review areas, buffer areas or floodplains.

[1] - These impacts include numbers of acres converted from forested wetland to scrub-shrub or emergent wetland and from scrub-shrub to emergent during operation of the pipeline.

[2] - These impacts represent the number of acres of wetland forest impacted during construction and operation. These wetland forest impacts are a total of all Project facilities (pipeline, access roads, pipeyards) constructed and operated as part of the Project.

[3] - These impacts represent numbers of acres of secondary upland impacts due to vegetation removal.

[4] - Minor apparent discrepancies between totals and sums of individual impacts are a result of rounding.

1.4 COMPENSATORY WETLAND MITIGATION NEEDS AND OPTIONS

In developing and preparing the wetland mitigation strategy for Project components located in Connecticut and Massachusetts, the proponent considered the 2010 NED Compensatory Mitigation Guidance document as well as the In-lieu fee programs for both these states. These programs/guidelines incorporate both the 2008 federal Compensatory Mitigation for Losses of Aquatic Resources; Final Rule (4/10/08; 33 CFR Parts 325 and 332 ("Mitigation Rule")) and the USACE Regulatory Guidance Letter 08-03: Minimum Monitoring Requirements for Compensatory Mitigation Projects Involving the Restoration, Establishment, and/or Enhancement of Aquatic Resources.

As based upon Tennessee's pre-application consultation with USACE personnel, the proponent understands that the New York and New England District will issue separate Section 404 authorizations for activities within their respective Districts. Information pertaining to mitigation strategies included herein is based upon discussions held during the above-noted consultation, the 2010 NED Compensatory Mitigation Guidance document, the In-lieu fee program instruments, and subsequent discussions with state and federal regulatory personnel. Again, the enclosed WMP is conceptual in nature and will be further developed as the project advances and subsequent to additional stakeholder and agency input.

As summarized in Table 1-1 and Table 1-2, the Project in New England will result in a total of 0.07 acres of permanent fill impacts (~113 CY associated with access road construction), 54.55 acres of temporary impacts (construction-related activities), and 9.07 acres of secondary impacts (permanent conversion of wetland vegetation type) to water resources of the United States located in Massachusetts and Connecticut (i.e., these values exclude impacts to Waters of the U.S. located in the New York portion of the project). In accordance with the USACE and USEPA goal of no net loss of wetland functions, Tennessee evaluated various approaches for compensating for the Project's impacts to water resources. Three basic types of compensation mechanisms were reviewed:

- Mitigation banks;
- In-lieu fee mitigation; and
- Permittee-responsible mitigation.

As part of this conceptual Plan, Tennessee conducted thorough evaluations of mitigation alternatives that would be appropriate to compensate for state-specific impacts. No mitigation banks currently exist in the Project area. Inland wetland in-lieu programs have been developed fairly recently in both Connecticut and Massachusetts, and permittee-responsible mitigation has been the primary compensation mechanism to mitigate wetland impacts in Connecticut and Massachusetts up to the present time. Consideration of both in-lieu fee mitigation and permittee responsible mitigation is anticipated for this Project in Connecticut Massachusetts.

The Connecticut In-lieu fee program (ILFP) and the Massachusetts ILFP are considered by Tennessee to be viable mitigation options, provided the details and accounting process for this type of utility project can be developed in an acceptable manner. Tennessee recognizes that both IFLPs have been established on a watershed basis to meet the 2008 Compensatory Mitigation Rule. The Connecticut and Massachusetts ILFPs were developed as a programmatic response to the historic loss of and continuing threat to aquatic resources in the region. These ILFP were designed to provide high quality mitigation and offer an alternative to USACE permittee-responsible, on-site compensatory mitigation. Historically, a portion of nationwide permittee-responsible wetland mitigation projects were unsuccessful, as they either were not completed or monitored; and/or monitoring revealed failure to meet project success criteria. The implementation of these ILFPs will allow a transfer of compensatory mitigation responsibility to ensure that high-quality wetland habitats are created and successfully established. The administering agencies have a proven history of successfully completing wetland habitat restoration projects. The Massachusetts ILFP is administered by the Department of Fish and Game and the Connecticut ILFP program is administered by the National Audubon Society, Inc.-Connecticut.

Under an ILFP, a permittee purchases mitigation credits for impacts within a specific area. These credits are paid to the administering agency who assumes the legal responsibility for compensatory mitigation implementation success and cover all costs associated with land acquisitions, engineering, permitting, construction, long term monitoring, and administrative costs for the mitigation areas, as well as a contingency amount to provide for any necessary corrective actions.

In general, when considering permittee-responsible compensation, "in kind" mitigation is typically preferred in order to most closely replicate impacted water resources. According to the NED Compensatory Mitigation Guidance, compensation sites should be located to provide the desired water resource functions, taking into consideration factors such as watershed location, aquatic habitat diversity, connectivity, and, for wetlands and streams, a balance of wetlands and uplands. Options include water resource restoration, creation, enhancement, and preservation. Of these, the NED Compensatory Mitigation Guidance states a preference for restoration but also acknowledges that "good restoration sites can be hard to find in New England".

In providing compensatory mitigation, Tennessee's overall goal for the Project is to provide no net loss of existing wetland functional values and statutory interests within the affected watersheds through the preservation, restoration, enhancement, and/or creation of wetlands. As detailed in the Compensatory Mitigation Guidance, the NED has developed standard compensatory mitigation ratios to provide a framework for compensatory mitigation. The compensation ratios focus on direct permanent impacts, with additional mitigation required to address temporary fill impacts and secondary impacts, such as conversion of forested wetlands to scrub-shrub or emergent wetlands. While these ratios are the starting point for developing appropriate compensatory mitigation, there is flexibility on a project-by-project basis in order to achieve the most appropriate mitigation for a specific project. Tables 1-3 and 1-4 reproduce the USACE NED guidance regarding compensatory mitigation ratios for permanent and temporary / secondary impacts, respectively. Note that these ratios do not fully account for pipeline construction that primarily impacts emergent wetlands and provides in-place restoration.

TABLE 1-3
USACE NED RECOMMENDED COMPENSATORY MITIGATION RATIOS FOR DIRECT PERMANENT IMPACTS
(Table 1 in the NED Compensatory Mitigation Guidance)

Mitigation/ Impacts	Restoration[1] (reestablishment)	Creation (establishment)	Enhancement (rehabilitation)	Preservation (protection/ management)
Emergent Wetlands (ac)	2:1	2:1 to 3:1	3:1 to 10:1[2]	15:1
Scrub-shrub Wetlands (ac)	2:1	2:1 to 3:1	3:1 to 10:1[2]	15:1
Forested Wetlands (ac)	2:1 to 3:1	3:1 to 4:1	5:1 to 10:1[2]	15:1
Open Water (ac)	1:1	1:1	project specific[3]	project specific
Submerged Aquatic Vegetation (ac)	5:1	project specific[4]	project specific[5]	N/A
Streams[6] (lf)	2:1[7]	N/A	3:1 to 5:1[8]	10:1 to 15:1[9]
Mudflat (ac)	2:1 to 3:1	2:1 to 3:1	project specific	project specific
Upland[10] (ac)	≥10:1[11]	N/A	project specific	15:1[12]

[1] Assumes no irreversible change has occurred to the hydrology. If there has been such a change, then the corresponding creation ratio should be used.

[2] Based on types of functions enhanced and/or degree of functional enhancement.

[3] Might include planting submerged and/or floating aquatics and/or removal of invasive species.

[4] Rare cases, e.g., removal of uplands, old fill, etc.

[5] E.g., remove pollutant source such as an outfall, remove moorings.

TABLE 1-3
USACE NED RECOMMENDED COMPENSATORY MITIGATION RATIOS FOR DIRECT PERMANENT IMPACTS
(Table 1 in the NED Compensatory Mitigation Guidance)

Mitigation/ Impacts	Restoration[1] (reestablishment)	Creation (establishment)	Enhancement (rehabilitation)	Preservation (protection/ management)

[6] Note that this assumes both banks will be restored/enhanced/protected. If only one bank will be restored/ enhanced/protected, use half the linear foot credit.

[7] E.g., daylighting stream, elimination of concrete channel.

[8] Enhancement of denuded banks and channelized streams = 3:1.

Enhancement of denuded banks when there is a natural channel = 4:1.

Enhancement when there are vegetated banks but the stream has been channelized = 5:1.

[9]Preserving buffer within the 100-foot minimum from channel = 10:1.

Preserving additional buffer 100 to 250 feet from channel = 15:1.

[10] This is when upland is used for wetland mitigation, NOT mitigation for upland impacts, which are not regulated.

[11] Only applies if existing condition is pavement or structure AND should complement aquatic functions.

[12] 100' upland buffer recommended for restoration, creation, and enhancement sites would be credited here.

TABLE 1-4
RECOMMENDED COMPENSATORY MITIGATION FOR TEMPORARY AND/OR SECONDARY IMPACTS
(Excerpted from Table 2 in the NED Compensatory Mitigation Guidance)

Impact	% Of Standard[1] Amount[2]
Temporary fill (swamp mats, fill over membrane) in forested wetlands; area to revegetate to forest.	10-25%
Temporary fill in emergent or scrub-shrub; area to revert to previous condition.	5-20%
Temporary fill in forest and will be permanently converted to scrub-shrub or emergent.	15-45%[3]
Permanent conversion of forested wetlands to other cover types.	15-40%
Removal of forested wetland cover for new corridor.	Project specific
Removal of forested cover of vernal pool buffer (w/in 250' of pool) when percentage of disturbance exceeds 25% of the total VP buffer area.	Project specific[4]
Streams – clearing of upland forest and/or scrub-shrub vegetation within 100' of stream bank or outermost channel of braided stream.	Project specific[5]

[1] "Standard" refers to amount of compensation that would be recommended under either the Corps' mitigation ratios for permanent fill (NED TABLE 1) or that required in In-lieu fee payments using the standard calculation.

[2] Percentages may be reduced if appropriate project-specific BMPs are incorporated into the project.

[3] For widening existing corridors only, not new. This does not take into account fragmentation impacts.

[4] Considerations in determining appropriate mitigation for secondary impacts to vernal pools should be on overall impact to the upland vernal pool buffer and how this affects the functions of the pool.

[5] Considerations in determining appropriate mitigation for secondary impacts to streams from loss of upland buffer should be on overall impact to the upland stream buffer and how this affects the functions of the stream.

Under the permittee-responsible mitigation option, to compensate for the Project's impacts to state and Federally-regulated wetland resource areas, Tennessee would anticipate developing a proposal that would consider various measures of in-situ/in-kind wetland restoration, land preservation, and/or other wetland enhancement measures.

On-ROW mitigation will occur in each state and will involve the restoration of wetlands and watercourses temporarily affected by Project construction activities, such as the installation of temporary fills (e.g., timber swamp mat access roads, timber work pads). Such water resources will be restored and stabilized to pre-existing conditions to the extent practicable during the Project ROW restoration efforts. As noted above, TWAs will be regraded and revegetated upon completion of construction activities.

To minimize the effects of the unavoidable impacts to state and Federally-regulated wetland resource areas during construction, Tennessee will implement best management practices ("BMPs") as outlined in the Project's "Wetland Invasive Species Management Plan " ("WISMP") (See the accompanying USACE Section 404 Attachment). The WISMP identifies the invasive wetland plant species that are of concern in the Project region and then reviews the wetlands along the Project ROWs where such species have been found. Although not all of the delineated wetlands proximate to the pipeline ROWs will be affected as a result of Project construction activities, those that will be disturbed could be more susceptible to colonization by invasive species. In addition, movement of construction equipment and materials through wetlands that presently contain invasive plants could promote the spread of invasive species to nearby, un-infested wetlands. The overall objective of the WISMP is to define the procedures to be used during Project construction to preserve the value and functions of wetlands along the Project ROWs that presently do not contain invasive species and to minimize the further spread of invasive plants within wetlands that already contain them. Construction best management practices will also be employed throughout the final design and implementation of the project, consistent with the procedures documented in submittals to the USACE as part of the Section 404 application.

2.0 COMPENSATORY WETLAND MITIGATION PLAN FOR THE CONNECTICUT EXPANSION PROJECT – CONNECTICUT SECTION

2.1 INTRODUCTION AND OVERVIEW

The Connecticut Loop commences in Agawam, Massachusetts, in the yard of Compressor Station 261 at MP 0.0 and extends southward approximately 8.1 miles to the terminus in Suffield, Connecticut. The portion of the pipeline along this loop section in Connecticut consists of approximately 7.99 miles of 24-inch OD pipeline co-located within or adjacent to Tennessee's existing ROW beginning at the Massachusetts and Connecticut state line.

The pipeline loop segments will be located within or directly adjacent to Tennessee's existing permanent ROW in Suffield and East Granby, Connecticut. Additional permanent ROW will be required along with TWS and ATWS to facilitate construction of the pipeline. The routing for the pipeline loop was conducted in a manner to avoid significant areas of residential development, minimize the number of affected landowners, and effectively minimize environmental impacts.

In accordance with the Council on Environmental Quality (CEQ) and Clean Water Act Section 404 (b)(1) guidance, Tennessee has designed this project to (1) avoid impacts to aquatic resources to the extent practicable; (2) minimize unavoidable impacts; and, (3) finally, compensate for any remaining impacts to aquatic resources. Additional detail regarding the project's avoidance and minimization strategies are presented in the accompanying permit authorization requests and in Section 1, above. The remainder of Section 2 focuses on the compensatory mitigation efforts proposed to address the Project's impacts to aquatic resources that could not be avoided or minimized.

Tennessee and AECOM representatives discussed the Connecticut portion of the proposed Project with USACE and Connecticut Department of Energy and Environmental Protection wetland resource regulatory personnel on December 3, 2013 and December 5, 2013, respectively. Issues, suggestions and concerns raised in those meetings regarding mitigation strategies have been incorporated into this proposed Conceptual WMP.

Per the NED guidance document, compensatory mitigation may be accomplished via mitigation banks or in-lieu fee programs where they exist, or though permittee-responsible mitigation. Section 2.4, below, addresses two potential compensatory mitigation strategies for the Connecticut portion of this Project: In-Lieu Fee mitigation and Permittee Responsible mitigation.

Table 2-1 denotes the USGS-classified watersheds crossed by the Connecticut portion of the Project. Restoration and preservation activities will be undertaken within the Lower Connecticut (HUC 8) watershed. Additional details regarding these mitigation strategies are presented in the subsequent sections.

TABLE 2-1
WATERSHEDS CROSSED BY THE CONNECTICUT EXPANSION PROJECT

Facility ID	County	Major Basin	HUC 8	HUC 10	HUC 12
Connecticut Loop					
Connecticut Loop	Hampden, MA Hartford, CT	Lower Connecticut	Mill River-Connecticut River	Pecousic Brook-Connecticut River	Muddy Brook Pecousic Brook-Connecticut River Stony Brook

Source: HUC Watershed Data - USGS National Hydrography Dataset (USGS 2011).

2.2 DESCRIPTION OF WETLANDS AND FUNCTIONS/VALUES

In support of meeting the USACE and USEPA goal of no net loss of wetland functions, a Functions and Values Assessment (FVA) has been completed to identify those wetland attributes that may be impacted as a result of the proposed Project.

The basic concept behind most wetland evaluation or assessment methods is that wetland characteristics contribute to give rise to wetland functions that have certain value to natural systems, including man. By assessing the relative importance of certain characteristics indicated by research or experience to contribute toward particular functions (e.g., the dominant vegetative class affects wildlife habitat value), and then weighting the various conditions which that characteristic may occur in wetlands (e.g., shallow marsh, wooded swamp, etc.), some picture of the relative significance a particular wetland may play in providing certain functions can be developed. This concept is fundamental to the wetland evaluation procedures that were drawn from to assess the functional values of the wetland areas on the site.

As listed and described in The Highway Methodology Workbook Supplement – Wetland Function and Values/A Descriptive Approach (U.S. Army Corps of Engineers, New England Division; September 1999), eight (8) functions and five (5) values may be associated with a given wetland. These functions/values include:

FUNCTIONS

- *Groundwater Recharge/Discharge* - This function considers the potential for the wetland to serve as a groundwater recharge and /or discharge area. It refers to the fundamental interaction between wetlands and aquifers, where there is potential for the wetland to contribute water to an aquifer (recharge) or to function as a groundwater discharge area.
- *Floodflow Alteration (Storage and Desynchronization)* - This function considers the effectiveness of the wetland in reducing flood damage by attenuating floodwaters for prolonged periods following precipitation and snow melt events.
- *Fish and Shellfish Habitat* - This function considers the effectiveness or importance of seasonal or permanent waterbodies associated with the wetlands in question for fish and shellfish habitat.
- *Sediment/Toxicant/Pathogen Retention* - This function reduces or prevents degradation of water quality. It relates to the effectiveness of the wetland to act as a trap for sediments, toxicants, or pathogens that may be contained in river or runoff water.
- *Nutrient Removal/Retention/Transformation* - This wetland function considers the effectiveness of the wetland to prevent adverse effects of excess nutrients entering aquifers or surface water.

The effectiveness is related to the ability of the wetland to trap and process these nutrients into other forms or tropic levels.

- *Production Export* - This function evaluates the effectiveness of the wetland to produce food or useable products for humans or other living organisms.
- *Sediment/Shoreline Stabilization* - This function considers the effectiveness of a wetland to stabilize stream banks and shorelines against erosion.
- *Wildlife Habitat* - This function considers the effectiveness of the wetland to provide habitat for various types and population of animals typically associated with wetlands and the wetland edge. Both resident and/or migrating species are considered.

VALUES

- *Recreation (Consumptive and Non-Consumptive)* - This value considers the suitability of the wetland and associated watercourses to provide recreational opportunities such as hiking, canoeing, boating, fishing, hunting, and other active or passive recreational activities. Both "consumptive" and "non-consumptive" types of recreation are considered.
- *Education/Scientific Value* - This function considers the Suitability of the wetland as a site for an "outdoor classroom" or as a location for scientific study or research.
- *Uniqueness/Heritage* - This value relates to the effectiveness of the wetland or its associated watersheds to provide certain special values such as archeological sites, unusual aesthetic qualities, historical events, unique plants, animals, geologic features, etc.
- *Visual Quality/Aesthetics* - This value relates to the visual and aesthetic qualities of the wetland.
- *Threatened or Endangered Species Habitat* - This function considers the suitability of the wetland or associated watersheds to support rare, threatened, or endangered species.

To document the functions and values of the Connecticut Expansion Project wetlands, each of the factors associated with the presence/absence of a specific function/value was evaluated relative to each project area wetland. Table 2-2, below, presents an inventory of the Connecticut wetlands potentially impacted by the proposed Project, and enumerates which of these 13 functions and values are associated with wetlands within or proximate to the Project footprint.

The majority of wetlands within the Connecticut portion of the Project which will be impacted by the Project's ROW expansion area provide forested habitat and are located in relatively large, contiguous tracts. These forested areas are located relatively high in their respective watersheds and the Project is located proximate to several steep gradient headwater streams. As such, the surrounding PFO wetlands provide important water quality and flood attenuation benefits, as well as offer habitat value.

While the project is an expansion of an existing pipeline ROW, expanded edge effects on wildlife habitat, and alteration of flood storage capacity and sediment retention capabilities may be anticipated as a result of the permanent conversion of PFO habitat. Additional detail regarding the impacts to these wetlands is presented in Section 2.3, below.

2.3 WETLAND IMPACTS

Construction of the Project pipeline facilities in Connecticut will temporarily alter approximately 44.28 acres of wetlands in Connecticut (44.97 acres will be temporarily altered in the entire CT Loop, which includes impacts in Agawam, MA). Within the CT Loop wetlands, 6.72 acres of palustrine forested and 0.15 acres of scrub-shrub wetlands will be permanently maintained post-construction in an emergent or low scrub-shrub vegetated cover type. Table 2-3 presents the impacts to Connecticut wetlands anticipated as a result of the proposed Project. Table 2-4 presents this information broken down by impact and wetland type.

TABLE 2-2
USACE HIGHWAY METHODOLOGY FVA: WETLANDS POTENTIALLY IMPACTED BY THE CT EXPANSION PROJECT

Town/State	Wetland Number	Wetland Classification[1]	Comments	Wetland Functions and Values[2]												
				GWR/D	FFA	F&SH	S&TR	NR&T	PE	S&S	WLH	REC	ED/S	U/H	VQ/A	T&E
Agawam, MA Suffield, CT	WCT-01/01B	PFO/PSS/PEM	Wetland crosses state boundaries.	X	X		X	X			X					
Suffield, CT	WCT-01A	PSS/PEM	Isolated Wetland	X	X		X	X			X					
Suffield, CT	WCT-01/01B	PFO/PSS/PEM	Drainage though agricultural fields	X	X		X	X			X					
Suffield, CT	WMA-02	PEM	Agricultural field.	X	X						X					
Suffield, CT	WCT-02	PSS/PEM		X	X		X	X			X					
Suffield, CT	WCT-03	PSS/PEM	Agricultural field.	X	X		X	X			X					
Suffield, CT	WCT-04	PFO		X	X		X	X	X		X				X	
Suffield, CT	WCT-05	PFO	Isolated. Contains (1) vernal pool.	X	X		X	X	X		X					
Suffield, CT	WCT-06	PFO/PEM	Contains (2) vernal pools.	X	X	X	X	X	X		X				X	
Suffield, CT	WCT-07	PFO/PEM	Contains (1) vernal pool.	X	X	X	X	X	X		X					
Suffield, CT	WCT-08	PFO	Small isolated wetland.	X				X			X					
Suffield, CT	WCT-09	PFO	Contains (1) vernal pool.	X			X	X	X		X			X		
Suffield, CT	WCT-10	PFO	Small isolated wetland.	X			X	X			X					
Suffield, CT	WCT-11	PFO/PSS/PEM	Headwaters of Clay Brook.	X	X		X	X			X					
Suffield, CT	WCT-12	PFO/PEM	Associated with Clay Brook perennial stream and agricultural field.	X	X	X	X	X			X					X
Suffield, CT	WCT-13	PFO	Vernal pool	X			X	X	X		X			X		X
Suffield, CT	WCT-14	PEM	Storm water collection basin.	X	X		X	X								X
Suffield, CT	WCT-15	PEM	Associated with Clay Brook, perennial stream. Portions used for a horse race track.	X	X		X	X		X						X
Suffield, CT	WCT-16	PFO/PEM	Large marsh associated with Clay Brook, perennial stream, and WCT-15. Includes agricultural fields.	X	X		X	X		X						X
Suffield, CT	WCT-17	PEM	Agricultural field.(hay)	X	X		X	X			X					
Suffield, CT	WCT-18	PEM	Contains vernal pool, and associated with Philo Brook, perennial stream Agricultural land present	X	X	X	X	X	X	X	X	X	X	X		X
Suffield, CT	WCT-19	PFO/PSS	Associated with intermittent tributary of Philo Brook.	X	X	X	X	X	X	X						X
Suffield, CT	WCT-20	PSS	Associated with intermittent tributary of Philo Brook.	X	X	X	X	X	X	X						
Suffield, CT	WCT-21	PEM	Agricultural field.(hay)	X	X		X	X			X					
Suffield, CT	WCT-21B	PEM	Mowed area	X	X		X	X			X					
Suffield, CT	WCT-22	PFO/PSS/PEM	Mostly Agricultural field (hay), with some mowed areas.	X	X		X	X			X					
Suffield, CT	WCT-23	PEM	Agricultural land	X	X		X	X			X					

TABLE 2-2
USACE HIGHWAY METHODOLOGY FVA: WETLANDS POTENTIALLY IMPACTED BY THE CT EXPANSION PROJECT

Town/State	Wetland Number	Wetland Classification[1]	Comments	Wetland Functions and Values[2]												
				GWR/D	FFA	F&SH	S&TR	NR&T	PE	S&S	WLH	REC	ED/S	U/H	VQ/A	T&E
Suffield, CT	WCT-24	PFO/PEM	Much of understory cleared out and most of area id maintained.	X	X		X	X			X					
Suffield, CT	WCT-25	PFO/PSS/PEM		X	X		X	X			X					
Suffield, CT	WCT-26	PFO/PEM	Combination of Agricultural land (hay) and PFO.	X	X		X	X			X					
Suffield, CT	WCT-27	PFO/PEM	Combination of Agricultural land (hay) and PFO.	X	X		X	X			X					
Suffield, CT	WCT-28	PFO/PEM	Combination of Agricultural land (hay) and PFO.	X	X		X	X			X					
Suffield, CT	WCT-29	PEM	Active Agricultural land.	X	X		X	X			X					
Suffield, CT	WCT-30	PEM	Associated with intermittent tributary of Stoney Brook. Within agricultural field	X	X	X			X		X					
Suffield, CT	WCT-31	PFO	Associated with intermittent tributary of Stoney Brook	X	X	X	X	X	X		X				X	
Suffield, CT	WCT-32	PFO	Contains two vernal pools	X	X		X	X			X		X	X	X	
Suffield, CT	VP-1 (next to WCT-32	PFO	In ROW but located in unflagged wetland on other side of centerline	X	X		X				X		X	X	X	
Suffield, CT	WCT-33	PFO	Contains 6 vernal pools	X	X		X	X	X		X		X	X	X	
Suffield, CT	WCT-34	PFO	Contains 2 vernal pools	X	X		X	X			X		X	X	X	
Suffield, CT	WCT-35	PFO	Isolated Wetland	X			X	X			X					
Suffield, CT	WCT-36	PFO/PSS	Contains 1 vernal pool and old agricultural fields	X			X	X			X					
Suffield, CT	WCT 37		Associated with Stony Brook and unnamed perennial stream. Floodplains and agricultural fields	X	X	X	X	X	X	X	X	X	X	X	X	X
Suffield, CT	WCT 38	PEM	agricultural Fields	X	X		X	X								
Suffield, CT	WCT 39	PFO/PSS	Contains 1 vernal pool	X	X		X	X			X		X			
Suffield, CT	WCT 40	PFO/PEM	Portion is within agricultural field	X	X		X	X								
Suffield, CT	WCT 41	PFO/PSS/PEM	Contains intermittent tributary to Stony Brook. agricultural Fields and 2 vernal pools	X	X	X	X	X	X		X			X	X	
Suffield, CT	WCT 42	PSS	agricultural Ditch, eventually drains into Stony Brook	X		X	X									
Suffield, CT	WCT 43	PFO	Portion is within agricultural field	X		X	X	X			X					
Suffield, CT	WCT 44	PFO	Contains intermittent tributary to Stony Brook	X	X	X	X	X	X		X					
Suffield, CT	WCT-45	PFO	Contains 2 vernal pools and intermittent tributary to Stony Brook	X	X	X	X	X	X	X	X		X	X	X	X
Suffield/East Granby, CT	WCT-46	PFO	Contains 2 vernal pools and 2 intermittent tributary to De Grayes Brook	X	X	X	X	X	X	X	X		X	X	X	X
East Granby, CT	WCT-47	PFO	Contains intermittent tributary to De Grayes Brook	X	X	X	X	X	X	X				X		X

TABLE 2-2
USACE HIGHWAY METHODOLOGY FVA: WETLANDS POTENTIALLY IMPACTED BY THE CT EXPANSION PROJECT

Town/State	Wetland Number	Wetland Classification[1]	Comments	Wetland Functions and Values[2]												
				GWR/D	FFA	F&SH	S&TR	NR&T	PE	S&S	WLH	REC	ED/S	U/H	VQ/A	T&E
East Granby, CT	WCT-48	PFO		X			X	X			X					X
East Granby, CT	WCT-48A	PFO/PEM		X			X	X			X					X
East Granby, CT	WCT-49	PSS	Contains 1 vernal pool	X	X		X	X			X		X	X	X	X
East Granby, CT	WCT-50	PFO/PSS/PEM	Contains De Grayes Brook and two intermittent tributaries to De Grayes Brook	X	X	X	X	X	X	X	X	X	X	X	X	X
East Granby, CT	WCT-50A	PFO/PSS/PEM	Contains De Grayes Brook	X	X	X	X	X	X	X	X	X	X	X	X	X
East Granby, CT	WCT-50B	PFO	Contains 1 vernal pool	X			X	X			X					
East Granby, CT	WCT-50C	PFO	Isolated wetland	X			X	X			X					
East Granby, CT	WCT-50D	PFO	Contains 1 vernal pool	X			X	X			X					
East Granby, CT	WCT-51	PFO/PEM	Contains 1 vernal pool and agricultural fields	X	X		X	X			X					X
East Granby, CT	WCT-52	PFO/PEM		X			X	X								
East Granby, CT	WCT-53	PFO/PEM	Contains De Grayes Brook and two intermittent tributaries to De Grayes Brook	X	X	X	X	X	X	X	X			X	X	
East Granby, CT	WCT-54	PFO/PSS/PEM	Contains De Grayes Brook and adjacent floodplains	X	X	X	X	X	X	X	X	X			X	
East Granby, CT	WCT-55	PSS	Contains De Grayes Brook and adjacent floodplains	X	X	X	X	X	X	X	X	X	X	X	X	X
Suffield, CT	WCT-56	PFO/PSS/PEM	Large wetland complex, includes areas of active agricultural fields.	X	X		X	X			X					X

1 Wetland Classification: PFO – Palustrine Forested Wetland, PSS – Palustrine Scrub-Shrub Wetland, PEM – Palustrine Emergent Wetland

2 Wetland Functions and Values:
GWR/D – Groundwater Recharge/Discharge,
FFA – Floodflow Alteration,
F&SH – Fish and Shellfish Habitat,
S&TR – Sediment/Toxicant Removal,
NR&T – Nutrient Removal,
PE – Production Export,
S&S – Sediment/Shoreline Stabilization,
WLH – Wildlife habitat,
REC – Recreation,
ED/S – Education/Scientific Value,
U/H – Uniqueness/Heritage,
VQ/A – Visual Quality/Aesthetics,
T&E – Endangered Species Habitat.

TABLE 2-3
ESTIMATED ACREAGE OF WATERS OF THE UNITED STATES TO BE IMPACTED – CT LOOP

Facility ID[a]	Palustrine Emergent (acres affected)		Palustrine Forested (acres affected)		Palustrine Scrub-Shrub (acres affected)		Total (acres affected)	
	Construction[b]	Operation[c]	Construction[b]	Operation[c]	Construction[b]	Operation[c]	Construction[b]	Operation[c]
Connecticut Loop	24.43	0.00	18.66	6.72	1.88	0.15	44.97	6.87

a: These values do not include 0.26 ac of temporary impacts associated with stream crossings in CT, where benthic habitats and banks will be restored in-place consistent with pre-existing conditions, or improved where possible.

b: Construction Acreage = all workspace during construction activities (TWS and ATWS plus permanent easement).

c: Operation Acreage = For conventional crossing methods: 30-foot width permanently maintained through forested wetlands, 10-foot width permanently maintained through scrub-shrub wetlands; there are no operation impacts to PEM wetlands as there is no change in the pre- and post-construction vegetation cover type.

TABLE 2-4
WETLANDS ASSOCIATED WITH THE CONNECTICUT EXPANSION PROJECT – CONNECTICUT LOOP

Wetland ID[a]	Milepost	Latitude Longitude	Town / County	Quadrangle	Wetland Class[b]	Crossing Length (ft)[c]	Wetland Impact (acres)[d]					State Wetland Classification[e]	Crossing Method[f]	Comments
							Construction			Operation				
							PEM	PFO	PSS	PFO	PSS			
Wetlands Associated With Pipeline Facilities														
WMA 01	0.07	42.03244/ -72.63412	Agawam/Hampden	West Springfield	PFO/PEM	337.53	0.16	0.32	0.11	0.13	-	BVW	II	Low lying forested wetland.
WMA 02	0.16	42.03113/ -72.63419	Suffield/Hartford	West Springfield	PEM	65.38	0.11	-	-	-	-	BVW	II	Low lying forested wetland.
WCT1	0.26	42.02957/ -72.63444	Suffield/Hartford	West Springfield	PEM/PFO	211.20	0.35	-	0.01	-	-	-	II	Low lying portion of an agricultural field
WCT2	0.37	42.02802/ -72.63468	Suffield/Hartford	West Springfield	PSS/PFO	25.13	0.07	0.06	-	0.00	-	-	II	Scrub shrub wetland associated with low lying portion of ag field and intermittent stream.
WCT 56	0.56	42.02556/ -72.6362	Suffield/Hartford	West Springfield	PEM/PSS/ PFO	1637.90	2.46	0.79	0.37	0.19	-	-	II	Large wetland associated with agricultural fields and wet forested areas.
WCT3	1.10	42.01949/ -72.64177	Suffield/Hartford	West Springfield	PEM	1164.92	2.07	-	0.05	-	-	-	II	Wet agricultural field
WCT4	1.23	42.01765/ -72.64264	Suffield/Hartford	West Springfield	PFO	119.35	-	0.18	-	0.08	-	-	II	Forested wetland associated with a high water table
WCT6	1.29	42.01677/ -72.64302	Suffield/Hartford	West Springfield	PFO	325.06	0.21	0.29	-	0.08	-	-	II	Forested wetland with potential vernal pool east of ROW
WCT7	1.37	42.01564/ -72.64343	Suffield/Hartford	West Springfield	PFO	168.08	0.12	0.08	-	0.04	-	-	II	Forested wetland
WCT8	1.38	42.01562/ -72.64356	Suffield/Hartford	West Springfield	PFO	0.00	-	0.01	-	-	-	-	II	Isolated forested wetland, potential vernal pool
WCT 9	1.44	42.01481/ -72.64396	Suffield/Hartford	West Springfield	PFO	212.20	0.18	0.23	-	0.01	-	-	II	Forested wetland associated with a high water table
WCT 10	1.47	42.01435/ -72.64419	Suffield/Hartford	West Springfield	PFO	14.59	-	0.01	-	0.01	-	-	II	Isolated forested wetland, potential vernal pool
WCT 11	1.55	42.01338/ -72.64476	Suffield/Hartford	West Springfield	PFO/PEM	560.60	0.54	0.44	0.07	0.00	0.01	-	II	Forested and emergent marsh associated with surface water and Clay Brook (SCT-12).
WCT 12	1.80	42.01012/ -72.64676	Suffield/Hartford	West Springfield	PEM/PFO	1510.15	1.78	0.67	-	0.21	-	-	II	Forested and emergent marsh associated with surface water and Clay Brook (SCT-12).
WCT 13	1.99	42.00786/ -72.64892	Suffield/Hartford	West Springfield	PFO	6.91	-	0.03	-	0.00	-	-	II	Forested wetland associated with surface water, potential vernal pool.
WCT 14	2.00	42.00762/ -72.6489	Suffield/Hartford	West Springfield	PEM	0.00	0.01	-	-		-	-	II	Emergent marsh that receives flow from WCT-13 via a small culvert under a cart path
WCT 15	2.08	42.00679/ -72.64993	Suffield/Hartford	West Springfield	PEM	447.49	0.76	-	-	-	-	-	II	Emergent marsh drains to Clay Brook
WCT 16	2.36	42.00338/ -72.6526	Suffield/Hartford	West Springfield	PFO/PSS/ PEM	2337.03	3.59	0.58	0.05	0.09	-	-	II	Large forest and emergent wetland drains east Clay Brook
WCT 17	2.59	42.00028/ -72.6543	Suffield/Hartford	West Springfield	PSS/PEM	0.00	0.07	-	-	-	-	-	II	Large emergent wetland drains east to Clay Brook

TABLE 2-4
WETLANDS ASSOCIATED WITH THE CONNECTICUT EXPANSION PROJECT – CONNECTICUT LOOP

Wetland ID[a]	Milepost	Latitude Longitude	Town / County	Quadrangle	Wetland Class[b]	Crossing Length (ft)[c]	Wetland Impact (acres)[d]					State Wetland Classification[e]	Crossing Method[f]	Comments
							Construction			Operation				
							PEM	PFO	PSS	PFO	PSS			
WCT 18	2.81	41.99791/ -72.65714	Suffield/Hartford	Windsor Locks	PFO/PEM	1676.00	1.22	1.27	0.35	0.57	0.05	-	II	Large emergent wetland and agricultural field adjacent to Muddy Brook
WCT 21	3.34	41.99115/ -72.66198	Suffield/Hartford	Windsor Locks	PEM/PFO	1068.22	1.84	-	-	-	-	-	II	Emergent agricultural field and forested wetland associated with high water table.
WCT 22	3.56	41.98839/ -72.66383	Suffield/Hartford	Windsor Locks	PFO/PEM	758.31	1.73	-	0.15	-	0.00	-	II	Emergent agricultural field associated with high water table.
WCT 24	3.73	41.98648/ -72.66604	Suffield/Hartford	Windsor Locks	PFO/PEM	537.85	0.48	0.08	0.37	0.02	0.05	-	II	Emergent and forested wetland associated with high water table
WCT 25	3.95	41.98409/ -72.6687	Suffield/Hartford	Windsor Locks	PFO	524.82	0.28	0.64	-	0.22	-	-	II	Emergent and forested wetland associated with high water table
WCT 26	4.04	41.98297/ -72.66952	Suffield/Hartford	Windsor Locks	PEM	127.56	0.13	0.11	-	0.03	-	-	II	Emergent agricultural field associated with high water table.
WCT 27	4.09	41.98235/ -72.66999	Suffield/Hartford	Windsor Locks	PEM	337.48	0.31	0.21	-	0.08	-	-	II	Emergent agricultural field associated with high water table.
WCT 28	4.15	41.98143/ -72.67052	Suffield/Hartford	Windsor Locks	PFO/PEM	0.00	0.01	0.04	-	0.00	-	-	II	Forested/emergent wetland at the lower edges of ag fields.
WCT 29	4.21	41.98071/ -72.67112	Suffield/Hartford	Windsor Locks	PEM	465.53	0.76	-	-	-	-	-	II	Emergent wetland associated with high water table of an ag field.
WCT 30	4.43	41.97822/ -72.67364	Suffield/Hartford	Windsor Locks	PEM	184.99	0.32	-	-	-	-	-	II	Emergent wetland associated with high water table and intermittent drainage channel within ag field.
WCT 31	4.61	41.97614/ -72.67589	Suffield/Hartford	Windsor Locks	PFO/PEM	379.95		0.68	-	0.26	-	-	II	Primarily a forested wetland associated with high water table.
WCT 32	4.78	41.97418/ -72.67798	Suffield/Hartford	Windsor Locks	PFO/PEM	269.52	0.00	0.48	-	0.19	-	-	II	Primarily a forested wetland associated with high water table and intermittent surface water
WCT 33	5.02	41.97151/ -72.68083	Suffield/Hartford	Windsor Locks	PFO	1572.94	0.27	2.39	-	1.04	-	-	II	Primarily a forested wetland associated with a high water table with emergent vegetation on the ROW
WCT 34	5.20	41.96942/ -72.68303	Suffield/Hartford	Windsor Locks	PFO/PSS/ PEM	108.00	0.00	-	0.19	-	0.02	-	II	Forested, scrub shrub, and emergent wetland associated with a high water table
WCT 36	5.33	41.96798/ -72.68457	Suffield/Hartford	Windsor Locks	PFO/PSS/ PEM	927.76	0.02	1.57	0.03	0.64	0.00	-	II	Forested, scrub shrub, and emergent wetland associated with a high water table and intermittent drainage.
WCT 37	5.58	41.96504/ -72.6873	Suffield/Hartford	Windsor Locks	PFO/PSS/ PEM	437.88	0.75	0.10	-	0.04	-	-	II	Wetland associated with Stony Brook banks and flood plain
WCT 38	5.80	41.96216/ -72.68905	Suffield/Hartford	Windsor Locks	PEM/PFO	472.40	0.99	-	-	-	-	-	II	Primarily an emergent wetland associated with ag field high water table.
WCT 39	5.94	41.96034/ -72.69027	Suffield/Hartford	Windsor Locks	PFO/PEM	22.14	0.06	0.02	-	0.01	-	-	II	Primarily a forested wetland associated with an intermittent channel
WCT 40	5.98	41.95982/ -72.6906	Suffield/Hartford	Windsor Locks	PFO/PEM	152.23	0.05	0.12	-	0.09	-	-	II	Primarily a forested wetland associated with an intermittent channel

TABLE 2-4
WETLANDS ASSOCIATED WITH THE CONNECTICUT EXPANSION PROJECT – CONNECTICUT LOOP

Wetland ID[a]	Milepost	Latitude Longitude	Town / County	Quadrangle	Wetland Class[b]	Crossing Length (ft)[c]	Wetland Impact (acres)[d]					State Wetland Classification[e]	Crossing Method[f]	Comments
							Construction			Operation				
							PEM	PFO	PSS	PFO	PSS			
WCT 41	6.18	41.95717/ -72.69217	Suffield/Hartford	Windsor Locks	PFO/PEM	1557.60	0.83	1.81	-	0.74	-	-	II	Primarily a forested wetland associated with surface water and intermittent channels.
WCT 42	6.36	41.95493/ -72.69381	Suffield/Hartford	Windsor Locks	PSS/PEM	93.80	0.00	0.10	-	0.06	-	-	II	Scrub shrub and emergent wetland associated with an intermittent channel.
WCT 43	6.42	41.95417/ -72.69444	Suffield/Hartford	Windsor Locks	PFO/PEM	126.65	0.13	0.08	-	0.01	-	-	II	Forested and emergent wetland downslope of an ag field.
WCT 44	6.45	41.9537/ -72.69483	Suffield/Hartford	Windsor Locks	PFO/PEM	38.99	0.01	0.07	-	0.03	-	-	II	Forested and emergent wetland associated with an intermittent channel.
WCT 45	6.53	41.95278/ -72.69561	Suffield/Hartford	Windsor Locks	PFO/PEM	483.05	-	0.82	-	0.33	-		II	Primarily a forested associated with an unnamed perennial stream with emergent vegetation at ROW
WCT 46	6.82	41.94922/ -72.69871	East Granby/Hartford	Windsor Locks	PFO/PEM	912.21	0.43	1.21	-	1.21	-	-	II	Forested wetland associated with perennial streams, and with emergent vegetation at ROW.
WCT 46	6.82	41.94922/ -72.69871	Suffield/Hartford	Windsor Locks	PFO/PEM	1142.29	0.08	1.89	-		-		II	
WCT 47	7.11	41.946/ -72.70232	East Granby/Hartford	Windsor Locks	PFO	23.61	-	0.06	-	0.02	-	-	II	Forested wetland associated with perennial streams.
WCT 48A	7.19	41.94532/ -72.70335	East Granby/Hartford	Windsor Locks	PEM/PFO	64.56	0.09	0.08	-	0.04	-	-	II	Forested and emergent wetland
WCT 49	7.23	41.94486/ -72.70395	East Granby/Hartford	Windsor Locks	PFO	86.53	-	-	0.13	-	0.02	-	II	Forested wetland
WCT 50	7.27	41.94444/ -72.70456	East Granby/Hartford	Windsor Locks	PFO/PEM	14.86	0.01	0.06	-	0.01	-	-	II	Forested wetland and emergent marsh associated with DeGrayes Brook
WCT 50 A	7.30	41.94421/ -72.705	East Granby/Hartford	Windsor Locks	PFO	41.18	-	0.07	-	0.03	-	-	II	Forested wetland associated with DeGrayes Brook
WCT 51	7.34	41.9439/ -72.70557	East Granby/Hartford	Windsor Locks	PFO/PEM	214.51	0.22	0.08	-	0.03	-	-	II	Primarily emergent marsh
WCT 52	7.42	41.9431/ -72.7067	East Granby/Hartford	Windsor Locks	PFO/PEM	149.59	0.09	-	-	-	-	-	II	Forested and emergent wetland
WCT 53	7.56	41.94131/ -72.70798	East Granby/Hartford	Windsor Locks	PSS/PFO	1063.46	0.82	0.93	-	0.15	-	-	II	Primarily scrub shrub wetland associated with DeGrayes Brook
WCT 54	7.81	41.9382/ -72.70964	East Granby/Hartford	Windsor Locks	PFO/PSS/ PEM	0	-	-	-	-	-	-	IV	Large wetland system associated with DeGrayes Brook and floodplain.
Pipeline Facilities Total						**25180**	**24.43**	**18.66**	**1.88**	**6.72**	**0.15**			
Wetlands Associated With Proposed Pipeyards														
None Identified (workspace layout will avoid impacting identified wetlands)														

TABLE 2-4
WETLANDS ASSOCIATED WITH THE CONNECTICUT EXPANSION PROJECT – CONNECTICUT LOOP

Wetland ID[a]	Milepost	Latitude Longitude	Town / County	Quadrangle	Wetland Class[b]	Crossing Length (ft)[c]	Wetland Impact (acres)[d]					State Wetland Classification[e]	Crossing Method[f]	Comments
							Construction			Operation				
							PEM	PFO	PSS	PFO	PSS			
Wetlands Associated With Access Roads														
WCT4	1.20	42.01788/ -72.64205	Suffield/Hartford	West Springfield	PFO	-	-	-	-	-	-	-	N/A	Forested wetland associated with a high water table
WCT 21	3.34	41.99135/ -72.66224	Suffield/Hartford	Windsor Locks	PEM/PFO	-	-	-	-	-	-	-	N/A	Emergent agricultural field and forested wetland associated with high water table.
WCT 21B	3.40	41.99062/ -72.66291	Suffield/Hartford	Windsor Locks	PEM/PFO	-	-	-	-	-	-	-	N/A	Primarily an agriculture field, Impacts to pipeline workspace and access road # 4
WCT 22	3.47	41.98964/ -72.66325	Suffield/Hartford	Windsor Locks	PFO/PEM	-	-	-	-	-	-	-	N/A	
WCT 26	4.05	41.98319/ -72.66962	Suffield/Hartford	Windsor Locks	PEM	-	-	-	-	0.0036	-	-	N/A	Emergent agricultural field associated with high water table. Impacts to pipeline and access road #5
WCT 27	4.03	41.98318/ -72.66978	Suffield/Hartford	Windsor Locks	PEM	-	-	-	-	0.0001	-	-	N/A	Emergent agricultural field associated with high water table. Impacts to pipeline and access road #5
WCT 29	4.17	41.98118/ -72.67048	Suffield/Hartford	Windsor Locks	PEM	-	-	-	-	-	-	-	N/A	Forested/emergent wetland at the lower edges of ag fields. Impacts to pipeline and access road #5
WCT 41	6.28	41.9561/ -72.69363	Suffield/Hartford	Windsor Locks	PFO/PEM	-	-	-	-	-	-	-	N/A	Emergent wetland associated with high water table of an ag field. Impacts to pipeline and access road #5
WCT 41A	6.20	41.95737/ -72.69371	Suffield/Hartford	Windsor Locks	PFO/PEM	-	-	-	-	-	-	-	N/A	Primarily a forested wetland associated with surface water and intermittent channels. Adjacent to access road # 7 no impact to pipeline workspace.
WCT 41D	6.27	41.95626/ -72.69371	Suffield/Hartford	Windsor Locks	PFO/PEM	-	-	-	-	-	-	-	N/A	Primarily a forested wetland associated with surface water and intermittent channels. Adjacent to access road # 7 no impact to pipeline workspace.
Access Roads Total							0	0	0	0.0037	0			
Connecticut Loop Total						25180	24.43	18.66	1.88	6.72	0.15			

N/A: Not applicable
a: Field wetland Identification Number.
b: Wetland classifications according to Cowardin et al 1979: PEM = Palustrine Emergent Wetland; PSS = Palustrine Scrub-Shrub Wetland; PFO = Palustrine Forested Wetland.
c: 0.0 = wetland is not crossed by pipeline but is in workspace.
d: Construction Acreage = all workspace during construction activities (TWS and ATWS plus permanent easement); Operation Acreage = 10-foot wide corridor permanently maintained in herbaceous vegetated cover through PSS wetlands, and 30-foot wide corridor permanently maintained through PFO wetlands where trees taller than 15 feet will be selectively cut and removed. The permanently maintained corridors represent a change in cover type from PFO to PSS and PEM or PSS to PEM; there is no operation impact on PEM wetlands, since there is no change in the pre- and post-construction vegetation cover type. Construction impacts were calculated using a proposed construction footprint surface area and existing landuse based on field surveys. Surface area of operational maintenance corridor as described above were used to calculate acres of operation impact to each pre-construction wetland vegetation cover type for each wetland included in the table. The ROW width at all wetland crossings is 75 feet, except for those wetlands described in Table 2.3-8.
e: Massachusetts Wetlands Classification BVW = Bordering Vegetated Wetland, Connecticut Inland Wetland and Watercourses Act (Section 22a-36 through 45 of the Connecticut General Statue) does not provide specific state wetland classifications.
f: Methods for wetlands are described in Section 2.3.5; I = Standard Crossing; II = Conventional Crossing; III = Push/Pull Crossing; IV = Horizontal Directional Drill; N/A = Wetland not crossed by pipeline
Note: The totals shown in this table may not equal the sum of addends due to rounding.

2.4 MITIGATION NEEDS AND OPTIONS

As noted above, the proponent anticipates that mitigation planning will be an ongoing process and that the mitigation approach outlined in this conceptual WMP will be further refined during future dialogue with regulators and other invested stakeholders.

In-Lieu Fee and Permittee Responsible mitigation strategies were explored as potential options for meeting compensatory mitigation requirements within Connecticut. As compensation for the unavoidable impacts proposed in associated with the Connecticut Loop portion of the Project, the following measures are considered viable components of a proposed compensatory mitigation approach:

- In-Situ restoration and plantings within areas of temporary impacts in the ROW in accordance with USACE wetland replication guidelines and monitoring of restoration success. Tennessee will restore (via regrading, re-vegetating using an appropriate New England seed mix and plantings) 24.43 acres of PEM wetlands, 18.66 acres of PFO wetlands and 1.88 acres of PSS wetlands.
- Following the Connecticut ILFP, provided the details and accounting process for this type of utility project can be developed in an acceptable manner.
- The permanent preservation of land parcels within the Lower Connecticut River watershed. In following this mitigation option, Tennessee would identify properties that contain appropriate acreage (as identified in Table 2-5) of forested wetland and other aquatic resources to compensate for the 6.72 acres of PFO wetland habitat that will be permanently converted to PEM habitat and for the <0.01 acres of permanent fill associated with Project construction in Connecticut.
- Tennessee will work with the identified property owner to place the site(s) into a permanent conservation easement.

Table 2-5 presents the summary of mitigation burden for the Connecticut portion of the Project using guidance obtained from USACE NED.

2.4.1 Wetland Restoration

Tennessee will conduct restoration planting of the proposed temporary workspace for pipeline construction within impacted wetland areas. Tennessee will maintain the integrity of wetlands within the Project alignment during construction the pipeline facilities through implementation of the Commission's Procedures as provided within the Environmental Assessment and enclosed in the accompanying USACE Section 404 of the CWA Individual Permit application. Supplemental restoration planting will be conducted after all major pipeline construction activities have been completed and the Project alignment has been restored to pre-existing contours and soil morphology.

Restoration planting will be consistent with USACE wetland mitigation guidelines that require plant densities of 600 plants-per-acre within forested wetlands, 400 of which shall consist of tree species. Tree species to be planted will consist of two-to-three foot whip-sized individuals in a variety of facultative wetland species obtained from a reputable plant nursery. No cultivars or other ornamental sub-species will be allowed as substitutes.

TABLE 2-5
SUMMARY OF MITIGATION BURDEN FOR CT PORTION OF THE CONNECTICUT EXPANSION PROJECT

Duration of Impacts	Wetland Habitat Type	Disclosed Impacts (Acres)	Duration Factor	Min Std Ratio	Mitigation Strategies	Restoration (Acres)	Creation (Acres)	Enhancement (Acres)	Preservation (Acres)
Temporary[1]	PEM/PSS	26.31	0.05	2	Restoration	2.63			
			0.05	2	Creation		2.63		
			0.05	3	Enhancement			3.95	
			0.05	15	Preservation				19.73
Temporary[1]	PFO	18.66	0.1	2	Restoration	3.73			
			0.1	2	Creation		3.73		
			0.1	3	Enhancement			5.60	
			0.1	15	Preservation				27.99
Secondary[2]	PFO	6.72	0.15	2	Restoration	2.02			
			0.15	3	Creation		3.02		
			0.15	5	Enhancement			5.04	
			0.15	15	Preservation				15.12
Permanent3	PFO	0	1	2	Restoration	0.00			
			1	3	Creation		0.00		
			1	5	Enhancement			0.00	
			1	15	Preservation				0.00
	PEM/PSS	0.01	1	2	Restoration	0			
			1	2	Creation		0		
			1	3	Enhancement			0	
			1	15	Preservation				0
If all compensation was accomplished using a single strategy, this would be the minimum burden for this project:						8.40	9.41	14.61	62.99

Notes:
1. The strategies presume that the impacted area is restored and is not permanently impacted.
2. Involves permanent conversion of forest to other cover types; excludes operational impacts to PSS
3. Involves fill/loss of any wetland type.

To ensure successful completion of the mitigation plan and increased survivorship of individual plantings, Tennessee will conduct the planting in mid-fall 2016 following completion of Project construction in early-fall of 2016. If actual construction timeframes do not accommodate a fall 2016 planting schedule, Tennessee shall conduct the planting as soon as practicable within the 2017 growing season with the understanding that installation of the plantings will be logistically impractical during inundated conditions that typically occur during early spring, while planting during drought or excessively hot conditions typically occurring in early- to mid-summer will be greatly increase the potential for individual mortality due to heat or water stress and supplemental irrigation of plantings is impractical if not impossible.

Planting will be conducted by a qualified and reputable landscape contractor under the supervision of a qualified wetland scientist contracted by Tennessee to provide oversight of the restoration activities. The landscape contractor and wetland scientist will be provided a copy of this wetland mitigation plan and apprised of Tennessee's obligations under the plan and USACE permit conditions. A wetland scientist / environmental inspector shall be on-site to monitor replanting of wetlands within TWSs to ensure compliance with the mitigation plan and to make adjustments when appropriate to meet mitigation goals.

Installation of the plantings will be conducted via foot traffic and hand tools to the extent practicable to avoid unnecessary impacts to restored wetland areas as a result of the planting activities. Where necessary, the landscape contractor shall use sheets of plywood or equivalent material for weight distribution along travel routes within saturated wetlands to protect soils from excessive rutting, compaction, or topsoil and subsoil mixing by foot traffic. If the use of mechanized equipment is necessary, the landscape contractor shall utilize small, lighter pieces of equipment such as a "bobcat" skid steer or equivalent, in conjunction with plywood sheeting to prevent impacts to saturated wetlands. Additionally, the number of required trips within a saturated wetland will be limited to the minimum number of trips necessary to accomplish the specific task. Any inadvertent impacts that occur during restoration planting activities, including but not limited to impacts outside of permitted work limits or excessive soil rutting, shall be immediately reported to Tennessee construction managers and restored to pre-existing conditions as soon as practicable. Spacing of individual plants will be conducted so as to maintain consistent areal canopy coverage and adequate sun exposure within the wetland as the plantings grow and mature. Additionally, consistent pre-determined spacing of individuals will ensure thorough and adequate replanting of the entire disturbed area, as well as limit the potential for confusion and subjective in-field spacing decisions by planting laborers.

Upon completion of wetland restoration activities, post construction monitoring will be completed. Invasive species control will be monitored, as outlined in the attached Wetland Invasive Species Control Plan (Attachment 1).

2.4.2 Connecticut in Lieu Fee Program

To address compensatory mitigation requirements remaining after the in-situ/in-kind wetland restoration activities described above are completed, the applicant examined several options. The National Audubon Society, Inc.-Connecticut (Audubon CT) and the USACE have a vehicle in place to complete off-site In-Lieu Fee mitigation projects within Connecticut. This option is considered a viable mitigation route by Tennessee provided the details and accounting process for this type of utility project can be developed in an acceptable manner. Implementation of the CT ILFP for this Project would occur within the Housatonic Service Area.

As noted in Table 2-5, the USACE NED standard ratio of 3:1 – 4:1 for creation of PFO habitat may be multiplied by a conversion factor of 15 – 40% for permanent conversion of forested wetlands to other cover types. This equates to a mitigation burden of 3.024 – 8.064 acres at the low end to 4.032 – 10.752 acres of wetland at the high end for the 6.72 acres of PFO habitat conversions.

In addition, the 0.01 acres of permanent fill placed into PEM/PSS wetlands would be compensated for at a mitigation burden of 2:1 to 3:1, for creation of PEM/PSS habitat. This equates to 0.02 to 0.03 acres of mitigation burden for the PEM/PSS wetland fill. Total range of mitigation values are 3.044 acres (132,597 sf) to 10.782 acres (469,664 sf) of mitigation burden.

Should the In-Lieu Fee option not be acceptable, Tennessee anticipates completing the required mitigation via land preservation activities, as described in Section 2.4.3, below.

2.4.3 Permittee Responsible Mitigation

As an option or a component of the mitigation program, Tennessee may propose land preservation initiatives to meet the remaining requirements relative to compensating for wetland function loss. Specifically, wetlands that will be permanently converted from palustrine forested (PFO) to scrub shrub or emergent (PSS/PEM) and the minor amount of fill in agricultural field PEM wetlands could be compensated for by such mitigation.

The search for appropriate land preservation parcels is ongoing and will be further refined concurrently with the permit application process, if warranted. Generalized details regarding the land preservation strategy are presented below. The proponent will search for a parcel, or multiple parcels, that meets the following requirements:

- Parcel(s) is/are located within the Lower Connecticut River (HUC 8) Watershed. An emphasis will be placed upon identifying parcels for preservation that are located as proximate to the impacted areas as possible.
- The selected parcel will provide some component of PFO wetland habitat. Parcels that include wetlands which provide the functions and values identified in Table 2-2 will be prioritized.
- The proposed pipeline route traverses predominantly forested areas. As such, forested areas within this watershed would be the primary acquisition target for land preservation.

Upon identifying an appropriate parcel for preservation, Tennessee would work with the landowner to purchase the parcel either fee simple or to acquire the development rights to the land and then place a conservation mandate, deed restriction or other restrictive covenant upon the land. The proponent would work with a land trust organization, or possibly a governmental agency, to transfer this parcel or development rights to ensure its preservation and management in perpetuity. A land trust (or state agency) would be selected to receive the conservation easement. The land trust ultimately selected for receivership would depend upon the geographic location of the selected parcel. Possible candidate land trusts working in the subject area include:

Potential National Land Trust Organizations:

Access Fund
American Land Conservancy
Appalachian Trail Conservancy
Civil War Trust
The Conservation Fund
Ducks Unlimited
Garden Conservancy
Humane Society Wildlife Land Trust
National Park Trust
National Trust for Historic Preservation
The Nature Conservancy
North American Land Trust
Trust for Public Land
Wilderness Land Trust

Potential Local Land Trust Organizations:

Suffield Land Conservancy
East Granby Land Trust
Granby Land Trust
Connecticut Farmland Trust

As noted in the NED compensatory wetland mitigation guidance document, "endowments to provide a funding source in perpetuity to long-term stewards are generally encouraged." Sufficient funds would be provided to ensure that the land trust may complete long-term easement monitoring and reporting requirements associated with the preserved lands.

The land preservation document would be prepared and submitted for USACE review prior to or in conjunction with the submission of the final mitigation plan. In order to avoid temporal losses associated with the Project, the proponent would attempt to initiate and/or complete land preservation efforts (parcel identification, legal documentation, development rights acquisition/fee simple purchase, and establishment of land management plan) prior to Project construction commencement in the fourth quarter winter 2015.

3.0 COMPENSATORY WETLAND MITIGATION PLAN FOR THE CONNECTICUT SECTION EXPANSION PROJECT – MASSACHUSETTS SECTION

3.1 INTRODUCTION AND OVERVIEW

The Massachusetts Loop of the Connecticut Expansion Project is located in Sandisfield, Massachusetts and consists of approximately 3.8 miles of new 36-inch outside diameter ("OD") pipeline co-located within or adjacent to Tennessee's existing 200 Line Mainline right-of-way ("ROW"). The loop segment commences near Tennessee's existing Mainline Valve ("MLV") 258 at MP 0.0 adjacent to Town Hill Road and extends southeast to approximately MP 3.8 southeast of South Beech Plain Road. The Connecticut Loop commences in Agawam, Massachusetts, in the yard of Compressor Station 261 at MP 0.0 and extends southward approximately 8.1 miles to the terminus in Suffield, Connecticut. The portion of the pipeline along this loop section in Massachusetts consists of approximately 0.11 miles of 24-inch OD pipeline co-located within or adjacent to Tennessee's existing ROW terminating at the Massachusetts and Connecticut state line.

The pipeline loop segments will be located within or directly adjacent to Tennessee's existing permanent ROW in Sandisfield and Agawam, Massachusetts. Additional permanent ROW will be required along with TWS and ATWS to facilitate construction of the pipeline. The routing for the pipeline loop was conducted in a manner to avoid significant areas of residential development, minimize the number of affected landowners, and effectively minimize environmental impacts.

Appurtenant facilities associated with the Project will include two pig launchers, one pig receiver and one relocated mainline valve to be constructed by Tennessee. One pig launcher will be constructed within the existing workspace at the Agawam Compressor Station property (in Agawam, MA) at the beginning of the Connecticut looping segment and a second pig launcher will be constructed within the workspace at MP 0.0 in Sandisfield off of Town Hill Road at the beginning the Massachusetts looping segment. A pig receiver will be located at the terminus of the Project at MP 3.8 in Sandisfield. Tennessee plans to relocate the existing valve site located off of Town Hill Road to the terminus at MP 3.8 to minimize impacts to state lands and place the valve site on private property at the terminus of the loop. All appurtenant facilities will be constructed within the proposed workspace in the pipeline ROW and will not require additional impacts.

In accordance with the Council on Environmental Quality (CEQ) and Clean Water Act Section 404 (b)(1) guidance, Tennessee has designed this project to (1) avoid impacts to aquatic resources to the extent practicable; (2) minimize unavoidable impacts; and, (3) finally, compensate for any remaining impacts to aquatic resources. Additional detail regarding the project's avoidance and minimization strategies are presented in the accompanying permit authorization requests and in Section 1, above. The remainder of Section 3 focuses on the compensatory mitigation efforts proposed to address the Project's impacts to aquatic resources that could not be avoided or minimized.

Tennessee and AECOM representatives discussed the Massachusetts portion of the proposed Project with USACE and Massachusetts Department of Environmental Protection (MA DEP) wetland resource regulatory personnel on December 3, 2013. Issues, suggestions and concerns raised in those meetings regarding mitigation strategies have been incorporated into this proposed Conceptual CMP.

Per the NED guidance document, compensatory mitigation may be accomplished via mitigation banks or in-lieu fee programs where they exist, or though permittee-responsible mitigation. Section 3.4, below, addresses two potential compensatory mitigation strategies for the Massachusetts portion of this Project: In-Lieu Fee mitigation and Permittee Responsible mitigation. To satisfy MA DEP and USACE requirements and requests, the proponents are considering a combination of In-Lieu Fee mitigation and

permittee-directed mitigation activities within Massachusetts. Specifically, on-ROW wetland restoration and participation in the USACE-Massachusetts Department of Fish and Game (MA DFG) In-lieu fee program are currently considered as viable options to achieve compensatory mitigation requirements.

Table 3-1 denotes the USGS-classified watersheds crossed by the Massachusetts portion of the Project. The permittee-responsible mitigation strategies described below activities will be undertaken within the Farmington River (HUC 8) watershed.

TABLE 3-1
WATERSHEDS CROSSED BY THE CONNECTICUT EXPANSION PROJECT

Facility ID	County	Major Basin	HUC 8	HUC 10	HUC 12
Massachusetts Loop					
Massachusetts Loop	Berkshire	Connecticut	Farmington River	West Branch Farmington River	Clam River

Source: HUC Watershed Data - USGS National Hydrography Dataset (USGS 2011).

3.2 DESCRIPTION OF WETLANDS AND FUNCTIONS/VALUES

In support of meeting the USACE and USEPA goal of no net loss of wetland functions, a Functions and Values Assessment (FVA) has been completed to identify those wetland attributes that may be impacted as a result of the proposed Project.

The basic concept behind most wetland evaluation or assessment methods is that wetland characteristics contribute to give rise to wetland functions that have certain value to natural systems, including man. By assessing the relative importance of certain characteristics indicated by research or experience to contribute toward particular functions (e.g., the dominant vegetative class affects wildlife habitat value), and then weighting the various conditions which that characteristic may occur in wetlands (e.g., shallow marsh, wooded swamp, etc.), some picture of the relative significance a particular wetland may play in providing certain functions can be developed. This concept is fundamental to the wetland evaluation procedures that were drawn from to assess the functional values of the wetland areas on the site.

As listed and described in The Highway Methodology Workbook Supplement – Wetland Function and Values/A Descriptive Approach (U.S. Army Corps of Engineers, New England Division; September 1999), eight (8) functions and five (5) values may be associated with a given wetland. These functions/values include:

FUNCTIONS

- *Groundwater Recharge/Discharge* - This function considers the potential for the wetland to serve as a groundwater recharge and /or discharge area. It refers to the fundamental interaction between wetlands and aquifers, where there is potential for the wetland to contribute water to an aquifer (recharge) or to function as a groundwater discharge area.
- *Floodflow Alteration (Storage and Desynchronization)* - This function considers the effectiveness of the wetland in reducing flood damage by attenuating floodwaters for prolonged periods following precipitation and snow melt events.
- *Fish and Shellfish Habitat* - This function considers the effectiveness or importance of seasonal or permanent waterbodies associated with the wetlands in question for fish and shellfish habitat.
- *Sediment/Toxicant/Pathogen Retention* - This function reduces or prevents degradation of water quality. It relates to the effectiveness of the wetland to act as a trap for sediments, toxicants, or pathogens that may be contained in river or runoff water.

- *Nutrient Removal/Retention/Transformation* - This wetland function considers the effectiveness of the wetland to prevent adverse effects of excess nutrients entering aquifers or surface water. The effectiveness is related to the ability of the wetland to trap and process these nutrients into other forms or tropic levels.
- *Production Export* - This function evaluates the effectiveness of the wetland to produce food or useable products for humans or other living organisms.
- *Sediment/Shoreline Stabilization* - This function considers the effectiveness of a wetland to stabilize stream banks and shorelines against erosion.
- *Wildlife Habitat* - This function considers the effectiveness of the wetland to provide habitat for various types and population of animals typically associated with wetlands and the wetland edge. Both resident and/or migrating species are considered.

VALUES

- *Recreation (Consumptive and Non-Consumptive)* - This value considers the suitability of the wetland and associated watercourses to provide recreational opportunities such as hiking, canoeing, boating, fishing, hunting, and other active or passive recreational activities. Both "consumptive" and "non-consumptive" types of recreation are considered.
- *Education/Scientific Value* - This function considers the Suitability of the wetland as a site for an "outdoor classroom" or as a location for scientific study or research.
- *Uniqueness/Heritage* - This value relates to the effectiveness of the wetland or its associated watersheds to provide certain special values such as archeological sites, unusual aesthetic qualities, historical events, unique plants, animals, geologic features, etc.
- *Visual Quality/Aesthetics* - This value relates to the visual and aesthetic qualities of the wetland.
- *Threatened or Endangered Species Habitat* - This function considers the suitability of the wetland or associated watersheds to support rare, threatened, or endangered species.

To document the functions and values of the Connecticut Expansion Project wetlands, each of the factors associated with the presence/absence of a specific function/value was evaluated relative to each project area wetland. Table 3-2, below, presents an inventory of the Massachusetts wetlands potentially impacted by the proposed Project, and enumerates which of these 13 functions and values are associated with wetlands within or proximate to the Project footprint.

The majority of wetlands within the Massachusetts portion of the Project which will be impacted by the Project's ROW expansion area provide forested habitat and are located in relatively large, contiguous tracts. These forested areas are located relatively high in their respective watersheds and the Project is located proximate to several steep gradient headwater streams. As such, the surrounding PFO wetlands provide important water quality and flood attenuation benefits, as well as offer habitat value.

While the project in an expansion of an existing pipeline ROW, expanded edge effects on wildlife habitat, and minor alteration of flood storage capacity and sediment retention capabilities may be anticipated as a result of the permanent conversion of PFO habitat. Additional detail regarding the impacts to these wetlands is presented in Section 3.3, below.

3.3 WETLAND IMPACTS

Construction of the Project pipeline facilities will temporarily alter approximately 10.28 acres of wetlands in Massachusetts (9.58 acres of temporary impacts in the MA Loop). Within the MA Loop wetlands, 2.11 acres of palustrine forested and 0.09 acres of scrub-shrub wetlands will be permanently maintained post-construction in an emergent or low scrub-shrub vegetated cover type. Table 3-3 presents the impacts to Massachusetts wetlands anticipated as a result of the proposed Project. Table 3-4 presents this information broken down by impact and wetland type.

TABLE 3-2
FUNCTIONS AND VALUES OF MASSACHUSETTS WETLANDS

Town/State	Wetland Number	Wetland Classification[1]	Comments	Wetland Functions and Values[2]												
				GWR/D	FFA	F&SH	S&TR	NR&T	PE	S&S	WLH	REC	ED/S	U/H	VQ/A	T&E
Agawam, MA	WMA-01	PFO/PEM	Depicted on CT loop mapping.	X			X	X			X					
Agawam, MA	WMA-01A	PFO	Contains a vernal pool. Depicted on CT loop mapping.	X	X		X	X	X		X				X	
Agawam, MA	WMA-01B	PFO	Depicted on CT loop mapping.	X	X		X	X			X					
Agawam, MA Suffield, CT	WCT-01/01B	PFO/PSS/PEM	Wetland crosses state boundaries.	X	X		X	X			X					
Sandisfield, MA	WMA-03	PFO/PEM	Contains (2) vernal pools.	X			X	X	X		X					
Sandisfield, MA	WMA-04	PFO	Isolated.	X	X		X	X			X					
Sandisfield, MA	WMA-05	PFO/PEM	Contains (1) vernal pool.	X	X		X	X	X		X				X	
Sandisfield, MA	WMA-06	PFO/PEM	Contains (1) vernal pool.	X	X		X	X	X		X					
Sandisfield, MA	WMA-07	PFO/PSS/PEM	Very large wetland, contains (6) vernal pools.	X	X		X	X	X		X				X	
Sandisfield, MA	WMA-08	PFO		X	X		X	X			X					
Sandisfield, MA	WMA-09	PFO		X	X		X	X			X					
Sandisfield, MA	WMA-10	PFO/PEM		X	X		X	X			X					
Sandisfield, MA	CVP-1	PFO	This area did not qualify as a wetland (no hydric soil or hydrophytic veg.) but did as a vernal pool.													
Sandisfield, MA	WMA-11	PFO		X	X		X	X			X					
Sandisfield, MA	WMA-12	PFO/PEM	Area contains (1) vernal pool.	X	X		X	X	X		X					
Sandisfield, MA	WMA-13	PFO/PEM	Isolated Area contains (1) vernal pool.	X	X		X	X	X		X					
Sandisfield, MA	WMA-14	PFO/PEM		X			X	X			X					
Sandisfield, MA	WMA-15	PFO/PEM		X			X	X			X					
Sandisfield, MA	WMA-16	PFO/PEM	Contains a vernal pool.	X	X		X	X	X		X					

TABLE 3-2
FUNCTIONS AND VALUES OF MASSACHUSETTS WETLANDS

Town/State	Wetland Number	Wetland Classification[1]	Comments	Wetland Functions and Values[2]												
				GWR/D	FFA	F&SH	S&TR	NR&T	PE	S&S	WLH	REC	ED/S	U/H	VQ/A	T&E
Sandisfield, MA	WMA-17	OW	Small pond	X	X	X	X	X			X					
Sandisfield, MA	WMA-18	PFO/PEM	Contains a vernal pool.	X	X			X	X		X			X	X	
Sandisfield, MA	WMA-19	PFO/PEM		X				X			X					
Sandisfield, MA	WMA-20	PFO/PEM	Associated with a perennial stream.	X	X	X	X	X	X		X					
Sandisfield, MA	WMA-21	PEM/PFO	Large marsh.	X	X	X	X	X	X	X	X		X	X	X	
Tyringham, MA	WMA-22	PEM	Ag field.	X	X						X					X
Sandisfield, MA	WMA-23	PFO/PEM	Entire wetland is an active pasture and contains (1) vernal pool.	X	X		X	X	X		X					
Sandisfield, MA	WMA-24	PFO/PEM	Entire wetland is an active pasture and contains (1) vernal pool.	X	X		X	X	X		X					
Sandisfield, MA	WMA-31	PFO	Associated with perennial tributary of Clam River.	X	X	X	X	X		X						

[1] Wetland Classification: PFO – Palustrine Forested Wetland, PSS – Palustrine Scrub-Shrub Wetland, PEM – Palustrine Emergent Wetland

[2] Wetland Functions and Values: GWR/D – Groundwater Recharge/Discharge, FFA – Floodflow Alteration, F&SH – Fish and Shellfish Habitat, S&TR – Sediment/Toxicant Removal, NR&T – Nutrient Removal, PE – Production Export, S&S – Sediment/Shoreline Stabilization, WLH – Wildlife habitat, REC – Recreation, ED/S – Education/Scientific Value, U/H – Uniqueness/Heritage, VQ/A – Visual Quality/Aesthetics, T&E – Endangered Species Habitat.

TABLE 3-3
ESTIMATED ACREAGE OF WATERS OF THE UNITED STATES TO BE IMPACTED – MA LOOP

Facility ID[a]	Palustrine Emergent (acres affected)		Palustrine Forested (acres affected)		Palustrine Scrub-Shrub (acres affected)		Total (acres affected)	
	Construction[b]	Operation[c]	Construction[b]	Operation[c]	Construction[b]	Operation[c]	Construction[b]	Operation[c]
Massachusetts Loop	3.34	0.00	6.03	2.11	0.21	0.09	9.58	2.20

a: These values do not include 0.11 ac of temporary impacts associated with stream crossings in MA, where benthic habitats and banks will be restored in-place consistent with pre-existing conditions, or improved where possible.

b: Construction Acreage = all workspace during construction activities (TWS and ATWS plus permanent easement).

c: Operation Acreage = For conventional crossing methods: 30-foot width permanently maintained through forested wetlands, 10-foot width permanently maintained through scrub-shrub wetlands; there are no operation impacts to PEM wetlands as there is no change in the pre- and post-construction vegetation cover type.

TABLE 3-4
WETLANDS ASSOCIATED WITH THE CONNECTICUT EXPANSION PROJECT – MA LOOP

Wetland ID[a]	Milepost	Latitude Longitude	Town / County	Quadrangle	Wetland Class[b]	Crossing Length (ft)[c]	Wetland Impact (acres)[d]					State Wetland Classification[e]	Crossing Method[f]	Comments
							Construction			Operation				
							PEM	PFO	PSS	PFO	PSS			
Wetlands Associated With Pipeline Facilities														
WMA-3	0.01	42.17803/ -73.1449	Sandisfield/Berkshire	Monterey	PEM/PFO	11.58	0.15	0.03	-	0.01	-	BVW	II	Forested and emergent wetland associated with an intermittent stream
WMA-5	0.33	42.17475/ -73.14061	Sandisfield/Berkshire	Monterey	PEM/PFO	19.09	0.01	0.04	-	0.01	-	BVW	II	Forested and emergent wetland associated with an intermittent stream channel
WMA-6	0.46	42.1734/ -73.13877	Sandisfield/Berkshire	Monterey	PEM/PFO	94.40	0.02	0.16	-	0.06	-	BVW	II	Forested and emergent wetland slopes west
WMA-7	0.89	42.16882/ -73.13324	Sandisfield/Berkshire	Monterey	PEM/PFO	1118.82	0.16	1.63	-	0.78	-	BVW	II	Large emergent and forested swamp
WMA-10	1.27	42.16438/ -73.12857	Sandisfield/Berkshire	Monterey	PEM/PFO	21.82	0.00	0.06	-	0.02	-	BVW	II	Emergent marsh vegetation within ROW with forested wetlands off ROW
WMA-12	1.51	42.16244/ -73.12504	Sandisfield/Berkshire	Monterey	PEM/PFO	461.44	0.39	0.34	-	0.04	-	BVW	II	Emergent marsh vegetation within ROW with forested wetlands off ROW
WMA-13	1.63	42.16098/ -73.12362	Sandisfield/Berkshire	Otis	PEM	502.31	0.39	-	-	-	-	N/A (isolated)	II	Emergent marsh
WMA-14	1.94	42.15728/ -73.12034	Sandisfield/Berkshire	Otis	PEM/PFO	388.57	0.36	0.39	-	0.09	-	BVW	II	Emergent marsh vegetation within ROW with forested wetlands off ROW
WMA-15	2.01	42.15679/ -73.11913	Sandisfield/Berkshire	Otis	PEM/PFO	241.83	0.22	0.21	-	0.09	-	BVW	II	Emergent marsh vegetation within ROW with forested wetlands off ROW
WMA-16	2.76	42.15148/ -73.10709	Sandisfield/Berkshire	Otis	PEM/PFO	888.50	0.47	0.97	0.15	0.40	0.03	BVW	II	Large emergent and forested swamp associated with a ponded area and a perennial stream
WMA-18	2.54	42.15384/ -73.11001	Sandisfield/Berkshire	Otis	PEM/PFO	305.01	0.20	0.34	-	0.10	-	BVW	II	Large forested and emergent swamp
WMA-19	2.45	42.15472/ -73.11135	Sandisfield/Berkshire	Otis	PEM/PFO	275.80	0.22	0.19	-	-	-	BVW	II	Forested and emergent wetland with disturbed soils in ROW.
WMA-20	2.89	42.15008/ -73.10563	Sandisfield/Berkshire	Otis	PEM/PFO	130.25	0.23	0.19	-	0.04	-	BVW	II	Large emergent and forested wetland associated with a perennial stream
WMA-21	3.30	42.14573/ -73.10016	Sandisfield/Berkshire	Otis	PEM/PFO	557.89	0.18	0.72	-	0.31	-	BVW	II	Large emergent marsh associated with a perennial stream
WMA-23	3.79	42.14078/ -73.09342	Sandisfield/Berkshire	Otis	PEM/PFO	311.38	0.37	0.76	0.06	0.16	-	BVW	II	
WMA-24	3.81	42.13976/ -73.09195	Sandisfield/Berkshire	Otis	PEM	0.00	0.00	-	-	-	-	BVW	N/A	
Pipeline Facilities Total						**5328.67**	**3.34**	**6.03**	**0.21**	**2.11**	**0.03**			

TABLE 3-4
WETLANDS ASSOCIATED WITH THE CONNECTICUT EXPANSION PROJECT – MA LOOP

Wetland ID[a]	Milepost	Latitude Longitude	Town / County	Quadrangle	Wetland Class[b]	Crossing Length (ft)[c]	Wetland Impact (acres)[d]					State Wetland Classification[e]	Crossing Method[f]	Comments
							Construction			Operation				
							PEM	PFO	PSS	PFO	PSS			
Wetlands Associated With Proposed Pipeyards														
No wetlands will be impacted from the use of Pipeyards														
Wetlands Associated With Access Roads														
WMA-16	2.73	42.15152/ -73.10795	Sandisfield/Berkshire	Otis	PEM/PFO	-	-	-	-	-	-	BVW	N/A	
WMA-23	3.81	42.13994/ -73.09325	Sandisfield/Berkshire	Otis	PEM/PFO	-	-	-	-	-	0.059	BVW	N/A	
WMA-24	3.81	42.13991/ -73.09319	Sandisfield/Berkshire	Otis	PEM	-	-	-	-	-	-	BVW	N/A	
Access Roads Total						**0**	**0**	**0**	**0**	**0**	**0.059**			
MA Loop Total						**5328.67**	**3.34**	**6.04**	**0.21**	**2.11**	**0.09**			

N/A: Not applicable

a: Field Wetland Identification Number.

b: Wetland classifications according to Cowardin et al 1979: PEM = Palustrine Emergent Wetland; PSS = Palustrine Scrub-Shrub Wetland; PFO = Palustrine Forested Wetland.

c: 0.0 = wetland is not crossed by pipeline but is in workspace.

d: Construction Acreage = all workspace during construction activities (TWS and ATWS plus permanent easement); Operation Acreage = 10-foot wide corridor permanently maintained in herbaceous vegetated cover through PSS wetlands, and 30-foot wide corridor permanently maintained through PFO wetlands where trees taller than 15 feet will be selectively cut and removed. The permanently maintained corridors represent a change in cover type from PFO to PSS and PEM or PSS to PEM; there is no operation impact on PEM wetlands, since there is no change in the pre- and post-construction vegetation cover type. Construction impacts were calculated using a proposed construction footprint surface area and existing landuse based on field surveys. Surface area of operational maintenance corridor as described above were used to calculate acres of operation impact to each pre-construction wetland vegetation cover type for each wetland included in the table. The ROW width at all wetland crossings is 75 feet, except for those wetlands described in Table 2.3-8.

e: Massachusetts Wetlands Classification BVW = Bordering Vegetated Wetland

f: Methods for wetlands are described in Section 2.3.5; I = Standard Crossing; II = Conventional Crossing; III = Push/Pull Crossing; IV = Horizontal Directional Drill; N/A = Wetland not crossed by pipeline

Note: The totals shown in this table may not equal the sum of addends due to rounding.

3.4 MITIGATION NEEDS AND OPTIONS

As noted above, the proponent anticipates that mitigation planning will be an ongoing process and that the mitigation approach outlined in this conceptual CMP will be further refined during future dialogue with regulators and other invested stakeholders.

In-Lieu Fee and Permittee Responsible mitigation strategies were explored as potential options for meeting compensatory mitigation requirements within Massachusetts. As compensation for the unavoidable impacts proposed in associated with the Massachusetts Loop portion of the Project, the following measures are proposed:

- In-Situ restoration and plantings within areas of temporary impacts in the ROW in accordance with USACE wetland replication guidelines and monitoring of restoration success. Tennessee will restore (via regrading, re-vegetating using an appropriate New England seed mix and plantings) 3.34 acres of PEM wetlands, 6.03 acres of PFO wetlands and 0.21 acres of PSS wetlands.
- Application of the Massachusetts ILFP, administered by the MA DFG, provided the accounting process for this type of utility project can be developed in an acceptable manner. Application of this mitigation option is considered primarily to address the compensatory mitigation burden for the 2.11 acres of PFO habitat that will be permanently converted to PSS habitat. The mitigation burden for 0.059 acres of permanent fill within WMA-23 could also be addressed via the ILFP.
- As an option to use of the Massachusetts In-lieu fee program, Tennessee would consider permittee-responsible compensatory mitigation options such as land preservation.

Table 3-5 presents the summary of mitigation burden for the Massachusetts portion of the Project.

TABLE 3-5
SUMMARY OF MITIGATION BURDEN FOR MA PORTION OF CONNECTICUT EXPANSION PROJECT

Duration of Impacts		Disclosed Impacts (Acres)	Duration Factor	Min Std Ratio	Mitigation Strategies	Restoration (Acres)	Creation (Acres)	Enhancement (Acres)	Preservation (Acres)
Temporary[1]	PEM/PSS	3.55	0.05	2	Restoration	0.358			
			0.05	2	Creation		0.358		
			0.05	3	Enhancement			0.537	
			0.05	15	Preservation				2.685
Temporary1	PFO	6.03	0.1	2	Restoration	1.208			
			0.1	2	Creation		1.208		
			0.1	3	Enhancement			1.812	
			0.1	15	Preservation				9.06
Secondary[2]	PFO	2.11	0.15	2	Restoration	0.633			
			0.15	3	Creation		0.9495		
			0.15	5	Enhancement			1.5825	
			0.15	15	Preservation				4.7475
Permanent[3]	PFO	0	1	2	Restoration	0			
			1	3	Creation		0		
			1	5	Enhancement			0	
			1	15	Preservation				0
	PEM/PSS	0.06	1	2	Restoration	0.12			
			1	2	Creation		0.12		
			1	3	Enhancement			0.18	
			1	15	Preservation				0.9
If all compensation was accomplished using a single strategy, this would be the minimum burden for this project:						2.32	2.64	4.11	17.39

Notes:
1. The strategies presume that the impacted area is restored and is not permanently impacted.
2. Involves permanent conversion of forest to other cover types; excludes operational impacts to PSS
3. Involves permanent fill/loss of any wetland type.

3.4.1 Wetland Restoration

Tennessee will conduct restoration planting of the proposed temporary workspace for pipeline construction within impacted wetland areas. Tennessee will maintain the integrity of wetlands within the Project alignment during construction the pipeline facilities through implementation of the Commission's Procedures as provided within the Environmental Assessment Report enclosed in the accompanying USACE Section 404 of the CWA Individual Permit application. Supplemental restoration planting will be conducted after all major pipeline construction activities have been completed and the Project alignment has been restored to pre-existing contours and soil morphology.

Restoration planting will be consistent with USACE wetland mitigation guidelines that require plant densities of 600 plants-per-acre within forested wetlands, 400 of which shall consist of tree species. Tree species to be planted will consist of two-to-three foot whip-sized individuals in a variety of facultative wetland species obtained from a reputable plant nursery. No cultivars or other ornamental sub-species will be allowed as substitutes.

To ensure successful completion of the mitigation plan and increased survivorship of individual plantings, Tennessee will conduct the planting in mid-fall 2016 following completion of Project construction in early-fall of 2016. If actual construction timeframes do not accommodate a fall 2016 planting schedule, Tennessee shall conduct the planting as soon as practicable within the 2017 growing season with the understanding that installation of the plantings will be logistically impractical during inundated conditions that typically occur during early spring, while planting during drought or excessively hot conditions typically occurring in early- to mid-summer will be greatly increase the potential for individual mortality due to heat or water stress and supplemental irrigation of plantings is impractical if not impossible.

Planting will be conducted by a qualified and reputable landscape contractor under the supervision of a qualified wetland scientist contracted by Tennessee to provide oversight of the restoration activities. The landscape contractor and wetland scientist will be provided a copy of this wetland mitigation plan and apprised of Tennessee's obligations under the plan and USACE permit conditions. A wetland scientist / environmental inspector shall be on-site to monitor replanting of wetlands within TWSs to ensure compliance with the mitigation plan and to make adjustments when appropriate to meet mitigation goals.

Installation of the plantings will be conducted via foot traffic and hand tools to the extent practicable to avoid unnecessary impacts to restored wetland areas as a result of the planting activities. Where necessary, the landscape contractor shall use sheets of plywood or equivalent material for weight distribution along travel routes within saturated wetlands to protect soils from excessive rutting, compaction, or topsoil and subsoil mixing by foot traffic. If the use of mechanized equipment is necessary, the landscape contractor shall utilize small, lighter pieces of equipment such as a "bobcat" skid steer or equivalent, in conjunction with plywood sheeting to prevent impacts to saturated wetlands. Additionally, the number of required trips within a saturated wetland will be limited to the minimum number of trips necessary to accomplish the specific task. Any inadvertent impacts that occur during restoration planting activities, including but not limited to impacts outside of permitted work limits or excessive soil rutting, shall be immediately reported to Tennessee construction managers and restored to pre-existing conditions as soon as practicable. Spacing of individual plants will be conducted so as to maintain consistent areal canopy coverage and adequate sun exposure within the wetland as the plantings grow and mature. Additionally, consistent pre-determined spacing of individuals will ensure thorough and adequate replanting of the entire disturbed area, as well as limit the potential for confusion and subjective in-field spacing decisions by planting laborers.

Upon completion of wetland restoration activities, post construction monitoring will be completed. Invasive species control will be monitored, as outlined in the attached Wetland Invasive Species Monitoring Plan (Attachment 1). In accordance with USACE NED wetland mitigation guidance, the restoration success will be monitored consecutively for the first five years at the site.

3.4.2 Massachusetts in Lieu Fee Program

The USACE and the MA Department of Fish and Game ("DFG") have entered into an agreement to have DFG administer a state-wide in-lieu fee program for compensatory wetland mitigation. MA DFG's recently developed a Final Instrument and guidance documents offer a comprehensive description of how DFG will administer this in-lieu fee program in Massachusetts. Based upon the December 3, 2013 conversations with USACE personnel, ILFP mitigation is the USACE NED's preferred approach for compensating for impacts associated with this Project in Massachusetts.

As outlined in the Final In-Lieu Fee Program Fact Sheet, "*the ILFP allows Corps permittees, as compensation for their project impacts to aquatic resources of the U.S. in Massachusetts, to make a monetary payment in-lieu of doing the permittee required mitigation. These in-lieu fee payments are made to the ILFP administered by DFG. As the ILFP sponsor, DFG, in turn, assumes legal responsibility for implementing the required mitigation, which it will accomplish by aggregating and expending the in-lieu funds received from Corps permittees for mitigation projects. DFG's state-wide ILFP covers impacts to all types of aquatic resources from both small-sized projects authorized under the General Permit and larger projects that require an individual permit from the Corps.*"

Provided acceptable to all involved parties, Tennessee would consider purchasing mitigation credits within the Massachusetts ILFP Berkshire/Taconic Service Area. These credits cover all costs associated with land acquisitions, engineering, permitting, construction, long term monitoring, and administrative costs for the mitigation areas, as well as a contingency amount to provide for any necessary corrective actions.

As noted in Tables 1-2 and 1-3, above, USACE NED standard ratio of 3:1 – 4:1 for creation of PFO habitat may be multiplied by a conversion factor of 15 – 40% for permanent conversion of forested wetlands to other cover types. This equates to a mitigation burden of 0.9495 – 1.266 acres at the low end to 2.532 – 3.376 acres of wetland at the high end for the 2.11 acres of PFO habitat conversions. In addition, the 0.059 acres of permanent fill placed into PEM/PSS wetlands associated with access road construction would be compensated for at a mitigation burden of 2:1 to 3:1, for creation of PEM/PSS habitat. This equates to 0.118 – 0.177 acres of mitigation burden for the PEM/PSS wetland fill.

Tennessee understands that the ILFP accounting will also consider the full range of Project elements, including all best management practices such as construction sequencing, avoidance/minimization of impacts, erosion and sediment control measures, stormwater management, invasive species control measures, and in-situ restoration measures. Tennessee believes that their proposed application of state-of-the-art best management measures as detailed in the Section 404 application materials warrant appropriate consideration in the accounting of mitigation costs under the Massachusetts ILFP.